THE ENGINEERING AND MINING JOURNAL

Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. L. OCTOBER 4. No. 14.

RICHARD P. ROTHWELL, C.E, M.E., Editor.

ROSSITER W. RAYMOND Ph.D., M.E. Special Contributor.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition

London: 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civ and Mining Engineer, Manager.

Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.

Peru, S. A.: Mr. John Newton, No. 2 Calle Constitucion, Calla.

Australasia: Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage:

Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, $4 per annum; $2.25 for six months; all other countries in the Postal Union, $5.

Monthly Export Edition, all countries, $2.50 gold value per annum.

REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

THE SCIENTIFIC PUBLISHING CO., Publishers,

SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager.

P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

	PAGE.
Export Notes Curtailed	381
New York Central Railroad Stand Against Knights of Labor	381
Export and Import of Silver Bullion, Coin and Ore	381
Meeting of Mining Engineers and Iron Workers	381
Comstock Mill Scandal	381
Causes of the Lead Famine	381
Our Export Trade	381
How to Avoid Strikes	382
The Electrical Engineers' Pocket Book	382
Heat: Science and Philosophy of its Production and Application	382
Books Received	382
Electric Pumping Machinery	382
The Present Status of the Russell Process	383
*Notes on the Bessemer Process	383
Electric Safety Lamp	387
A Thirty Years' Retrospect of the Iron Trade	387
*The Development of American Blast Furnaces with Special Reference to Large Yields	388
*Industries of Houghton County, Michigan	391
The New York Meeting of the American Institute of Mining Engineers, the British Iron and Steel Institute, and the Verein Deutscher Eisenhuettenleute	392
Dividends Paid by Mining Companies	394
Personals, Obituary	395
Items for Exporters	395
Industrial Notes	396
Contracting Notes	396
Machinery and Supplies Wanted at Home and Abroad	396

* Illustrated.

MINING NEWS:	Germany 398	Boston.....405	Cleveland.....401
Alabama 396	MEETINGS.....398	Coal Stocks.. 405	Louisville.....402
California.....396	DIVIDENDS.....398	London.....406	Philadelphia...402
Colorado.. 396	ASSESSMENTS....398	New York.....405	Pittsburg.....402
Idaho 396		Pittsburg.....406	
Kansas.....396	MINING STOCK MARKETS:	Paris.....406	IMPORTS AND EXPORTS.....403
Maryland 396	New York.....398	San Francisco. 405	
Michigan.....396	Boston.....398	St. Louis 406	CHEMICALS AND MINERALS.....402
Missouri.... 397	Denver 398	Trust Stocks. 406	
Montana.....397	Kansas City...399		BUILDING MATERIAL MARKET.403
Nevada.....397	Lake Superior Gold and Iron Stocks.....399	MARKETS:	
South Dakota...397		COAL:	CURRENT PRICES:
Pennsylvania....397	Salt Lake.....399	New York. 399	Chemicals.....406
Tennessee 397	St. Louis.....399	Boston.....400	Minerals..... 406
FOREIGN:	Pipe Line.....399	Chicago 400	Rarer Metals. 406
Argentine Republic.... 397	MINING STOCK TABLES:	Pittsburg.....400	Building Mat'r.406
Canada 397	Baltimore.....406	METALS.....400	
Cent. America..397	Birmingham...406	IRON:	ADV. INDEX...xxiii
Cuba.....398		New York. ... 401	
Mexico 398		Chicago 401	

IN consequence of the pressure on our space owing to the meeting this week in New York of the British Iron and Steel Institute and the American Institute of Mining Engineers, and the necessity for publishing certain of the papers read thereat, we have been reluctantly obliged to lessen the amount of space usually devoted to matters of interest to the general export trade.

THE Knights of Labor have been taught a severe lesson as the result of their contest with the New York Central Railroad Company. The circular just issued over the signature of H. Walter Webb, third vice-president of the company, states in unmistakeable language that the employés of the New York Central must in future choose between the order or their employers. It is clearly the future policy of the company to exclude from its service all Knights of Labor, and this is not to be wondered at considering its experience of the ill-judged strike just passed through which the energy of the executive happily rendered abortive.

THE director of the mint has pointed out in a communication to the ENGINEERING AND MINING JOURNAL that the figures of net import and export of silver furnished to the Treasury by the Bureau of Statistics differ from those published in the JOURNAL of last week. According to these figures, furnished to us by Mr. E. O. LUCH, the net import of silver into the United States for the four months ending August 31st, 1890, was $2,299,161, and the net export for the same months of 1889 was $5,262,780. The figures for the four months of the present calendar year include the export of silver ores, amounting to $1,860,873.

In these figures now furnished to us bullion, coin and ore, both imported and exported are included, while in the figures given in the ENGINEERING AND MINING JOURNAL last week, only coin and bullion were dealt with. Our figures originated from the same authority, viz.: the Bureau of Statistics, and were current in the market during the week, and published in the *Evening Post* of the 18th.

THE meeting of the English and German iron makers with our American Institute of Mining Engineers, which has been in session here all week has been altogether successful and an extremely agreeable affair. Great preparations are being made in other places for the reception of our foreign guests, and everything promises to make this visit memorable. Our good cousins will find a warm welcome everywhere and ready replies to every inquiry for information. Such meetings, in cementing personal friendships, bring nations nearer to each other and avert those calamities engendered of distrust and ignorance which have desolated so many countries.

One opinion seems to be pretty generally entertained by our English manufacturing guests: it is a feeling of gratitude that this country has adopted the protective policy to its present extent, for it leaves the world's markets in the control of the English, while low tariffs or free trade would undoubtedly make us formidable rivals.

OUR editorial remarks last week concerning the Comstock Mill scandal are bringing many communications. We have room this week for but a few, but will hereafter publish the letters and comment thereon. On another page will be found the official "complaint" of the stockholders of the Hale & Norcross mine. It is indeed high time that the *bona-fide* mine stockholders should take the control of their properties in their own hands and not allow the mill ring to vote their stock through the "trustee" in whose name it has been issued, but who has usually no interest whatever in the property. The stockholders should have the stock placed in their own names, or at least have it produced and voted by the actual owner at the election. By communicating with Mr. M. W. FOX, of the Mining Stock Association, 324 Pine street, San Francisco, stockholders in any of the Comstock mines can ascertain what is to be done to protect their interests. The ENGINEERING AND MINING JOURNAL will be pleased to hear from those who have "grievances" or information to contribute.

THE lead famine still continues, and that it is owing to the shortness of supply in the United States of suitable smelting material and fluxing ores there is no question of doubt from the state of affairs now existing in Leadville, Colo. This district, when the discussion was going on as to whether Mexican fluxing ores were to be admitted or not, was represented by those opposing the admission as being capable of furnishing not only sufficient for its own smelting industry, but a large surplus for smelters established elsewhere. Now, Leadville is actually importing Mexican fluxing ores spite of the long haul and high price, to keep her own smelters going!

The statistical position of lead is that last year the consumption exceeded the production by about 10,000 tons, and that this year the consumption has certainly not been on a smaller scale. The supply last year was furnished partly by about 28,000 tons of lead imported from Mexico in ore; this supply this year will be cut down to about 14,000 tons, so that simply to maintain our position with light stocks, such as we entered the year with, we shall have to import some 20,000 tons of pig lead before the end of the year.

OUR EXPORT TRADE.

A report by United States Consul ESTES, of Kingston, Jamaica, gives the practical experience of a member of a syndicate of Massachusetts manufacturers, who was sent to Spanish-America and the West Indies to see what was necessary to increase the trade of the syndicate. The lessons inculcated are plain and simple, and coming from such a source, the situation being viewed only from the cold standpoint of dollars and cents, should be carefully studied by all our exporting houses.

We are not surprised to learn that "subsidizing steamship lines to enable us to obtain a share in this commerce is premature," the steam communication between the West Indies, Central America, the Spanish Main, and the United States being already more frequent than it is between those countries and Europe, the only trouble being that these steamships are engaged in carrying to the United States the products of these countries, and not our manufactured goods o them. The keynote

of the situation is touched when we find the sentence, "But if every point of importance in the South was in weekly communication with the United States, and manufactured goods carried free of freight and invoiced 10 per cent. less than corresponding European goods, there would then be few, if any, more purchases than now, or as long as the present imperfect knowledge of exporting exists in the United States."

This is what we have insisted on time and again to our exporting houses and manufacturers. "Study the wants and customs of the people you are exporting to, and do not try to force our customs upon them."

For instance, in Central America and several other countries duties on manufactured goods are calculated on the gross weight, including box, barrel or case, and in one instance native merchants who had been persuaded into sending orders to the United States showed the Consul's informant the heavy, clumsy boxes in which the goods came and which had unnecessarily added 22 per cent. cost to the goods contained.

With regard to means of communication by steamships we have always maintained that the shipping follows the trade, and not the reverse. There is no doubt that a certain amount of development is going on in the direction of establishing direct steam communication between our ports and foreign countries. In addition to the direct Australian line, the establishment of which we referred to in our last export edition, we learn that the pioneer South-American house of Messrs. W. R. Grace & Co. has chartered the steamship "Mount Tabor," and will run that vessel regularly between the port of New York and the west coast of South America. And to meet the growing trade between this country and Spain and Portugal, a new line of steamers has been established under the Portuguese flag, plying between the ports of New York, Lisbon, Cadiz and Fayal.

HOW TO AVOID STRIKES.

The extremely moderate and rational tone of the reply of Judge DEAN, the president of the Cresson & Clearfield Coal and Coke Company, to the miners, dealing with the demands made by them upon the mine operators of district No. 2, embracing the Clearfield and Mountain regions, leads us to hope that a serious strike affecting about 25,000 men will be avoided. The whole style of this masterly address is a model for any employers of labor to adopt in dealing with a body of men who are possessed of common sense and capable of appreciating reason and fairness. In the preamble Judge DEAN points out that the proposed scale of prices for mining agreed on by the miners of the district in convention makes demands which, if enforced, at present selling prices of coal, would close the mines of the company he represents and, in his belief, every mine in the district. He further gives the men credit for having in all probability acted without a knowledge of the facts as they exist on the side of the operators, and believes that if there had been a full consultation between fair, candid and intelligent men, operators and miners, prior to holding the convention, the action of the miners would have been different. This frank concession to the men on the part of the company of the right to make demands, and the appeal to them as fair, candid and intelligent men, was certainly the best way to insure fair consideration of the arguments of the mine operators. Then comes the plain *argumentum ad hominem* in the following words, which could certainly be understood by those interested:

"It seems to me our interests are so identified that it would be advantageous to us both to at least try to ascertain the facts on each side before taking such important steps affecting so seriously so many persons and such large investments of capital. We have invested over a million dollars in money; you have here the labor of more than five hundred persons. We want to sell coal at a reasonable profit; you want to mine it at fair wages. If we do not pay fair wages you cannot afford to work for us and our mines must 'shut down.' If you demand unreasonably high wages we cannot afford to go on; the mines must 'shut down.' Neither of us makes anything by the shut down; our capital lies idle; our improvements go to rack; you are idle for a longer or shorter time; lose time in hunting another place or other employment, beside expense of moving, with probably no larger returns for your work at the new place than you were receiving here; because wherever you may go you will not get more than fair wages; no operator can afford to pay more; if he attempts it bankruptcy and a 'shut down' soon follow. What is fair wages depends not on what you would like to get, or what we would like to pay, but on what, in view of the condition of the market and the nature of the competition we have to meet, we can afford to pay."

The demands of the miners were twenty-six in number, and through these Judge DEAN goes carefully in his reply, conceding the point asked in some cases where fairness supported it, offering to make other changes requested if the miners could bring forward well-founded objections to the present method and, in the case of those that affected the price of coal, tendering an inspection of the books of the company to prove to the satisfaction of the men that an advance in coal was incompatible with a continuance of operations.

The whole case is clearly summed up in these words: "The proposed scale seems to me to be based on a mistaken belief that this company is making large profits in which the miner does not share. You are receiving substantially fair wages in view of the condition of the coal business; this company at the same time has not earned and is not earning a fair profit on its large invested capital; nor do I believe any other operator in the district is in any better condition.

Your right to organize and in convention adopt a scale advantageous to you is not questioned; but a scale to be a fair one or a practicable one must be based on existing conditions, on facts, and not alone on the interest of those who adopt it. In a business such as ours, which cannot be carried on by the operator without the miner, or by the miner without the operator, there never can be steady prosperity for both unless there be reciprocal good will, fairness and candor."

While it may happen that in many cases the employer of labor, against whom a strike is threatened, has not so good a case on which to rest in reasoning the dispute out with his men, we cannot too earnestly commend the style of argument adopted by Judge DEAN, and we believe that were the demands of employés always met with a similar cool, judicial and painstaking exposition of the situation many disastrous strikes would be avoided.

NEW PUBLICATIONS

THE ELECTRICAL ENGINEER'S POCKET BOOK OF MODERN RULES, FORMULÆ, TABLES AND DATA. By H. R. Kemp. Illustrated. 248 pages. Published by Crosby, Lockwood & Son, London. Price, $1.75.

This is an admirable little pocket-book, the scope of which is clearly shown in its title. The author claims that a great deal of his information is original, and that it has been carefully condensed, only that which in practical use has been found of constant value being included. In its range, however, the book covers a wide field of present practice, all matters which possess merely a historical or literary interest being avoided. In addition to the mathematical tables, weights and measures, etc., usually included in engineers' pocket-books, the strictly electrical part includes electro-chemistry, primary batteries, accumulators, electro-metallurgy, dynamos, motors, electric light, telephones, telegraphs, etc.

HEAT: SCIENCE AND PHILOSOPHY OF ITS PRODUCTION AND APPLICATION TO THE WARMING AND VENTILATION OF BUILDINGS, THE ABSORBING AND TRANSMITTING POWER OF DIFFERENT BOILER AND RADIATOR SURFACES WITH STEAM AND WATER CIRCULATION. VENTILATION BY FANS AND WATER MOTORS WITH HYDRANT PRESSURE. ALSO PLANS, TABLES AND DIAGRAMS OF EXPERIMENTAL WORK, AND RESULTS OF ACTUAT CONSTRUCTION. By John H. Mills. 2 volumes, 600 pages. Published by the author, Boston, Mass. Price, $12.

In printing our review of these volumes in last week's issue, the concluding portion was accidentally omitted. We supply it herewith:

In the latter part of Vol. I. the author gives a description of several kinds of steam boilers adapted especially for steam heating, and he plainly favors the sectional type of boiler, such as the Harrison, Root and Mills boilers, which are described and illustrated. He treats of the dangerous nature of the ordinary forms of shell boiler.

Vol. II. contains chiefly a description of various forms of steam and water heating and mechanical ventilating apparatus, and of tests made by the author of the efficiency of different forms of radiators. A large number of tables, formulæ, diagrams and illustrations are given. In this part of the work the author is much more at home than in the scientific discussions in Vol. I., and he has done himself great credit in massing together in readable shape a larger amount of data on his subject than can be found anywhere else. Much of the work is original with the author, and is so well done that the volume will be a valuable work of reference to any engineer who is interested in the subjects of heating and ventilation. On the whole, the merits of Vol. II. more than counterbalance the demerits of Vol. I., but it is to be regretted that the two volumes have not been condensed into one.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that o book buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

Bulletin de la Société de l'Industrie Minérale. Third series, vol. III, 1889 Saint-Etienne.

Der Tunnelbau-Tunneling. A text-book in four parts. By Carl Dolezalek, Professor at the Technical School at Hannover, Germany. Published by Helwingsche, Verlagsbuchhandlung, Hannover, Germany, 1890. 2 parts. Pages 192. Illustrated.

Electric Pumping Machinery.—The Clearfield Bituminous Coal Corporation has, according to *American Manufacturer*, completed an electric pumping plant at its "Grass Flat" mine at Peale, Clearfield county, Pa. As the mine is extremely wet, to meet the difficulty by steam power would have necessitated two shafts, approximately 100 feet deep, to be sunk, and two pumps and boilers to be located inside of the mine. To obviate this, expedite the work and avoid large first cost the electric plant was put in with marked success. The apparatus consists of an eight horse power compound dynamo, a five horse power motor for the pump in No. 9, and the same make of motor of one and one-half horse power for the pump in No. 10. The dynamo, with Lidgerwood engine and boiler, is located at the mouth of the drifts and furnishes power to both pumps. The five horse power motor, located 3,000 feet from the dynamo, is running a Gould rotary bronze pump with capacity of 15,000 gallons per hour, elevating the water 22 feet for a distance of 520 feet, whence it flows off by natural drainage. The smaller motor in No. 10 will control a centrifugal pump with a capacity of 2,400 gallons per hour, elevating 15 feet for a distance of 500 feet. The larger pump is in daily operation, running, when needed, to its full capacity and giving complete satisfaction. The small pump will be put in on completion of some connections in the mine.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Present Status of the Russell Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In accordance with your request, I give you the following opinion on the present status of the Russell process.

While a great deal has been published about the Russell process in mining papers, transactions of technical societies and books on metallurgy, it cannot be said that this new process has as yet found a permanent home in the United States and in Mexico.

First introduced in September, 1884, at Silver Reef, Utah, the Russell process is to-day in successful operation in two mills only, namely, in the Marsac mill, Park City, Utah, and in Las Yedras, Sinaloa, Mexico. In the latter place it was introduced in November, 1887, and in the former mill since the beginning of 1889. No wonder, then, the Russell process has been considered by many very beautiful in theory but utterly worthless in practice. This, of course, would refer to lixiviation generally, not to the Russell process alone. Outside of the Marsac mill, lixiviation is at present practiced in the United States only at Cortez, Nevada.

Now, there must be some tangible reasons for this state of affairs. Either the many noted metallurgists who passed favorable criticism upon the Russell process, and predicted its brilliant success, were mere theoretical dreamers or the process presented technical difficulties not easily overcome, or it failed on account of incompetent business management.

To invent a new process and perfect it technically is one thing—to make it financially a success is an entirely different affair. Inventors are only too often deficient in qualifications for managing their own business successfully. If a new process is not made a financial success at the very beginning of its introduction, it takes years to obliterate the odium of a failure. I met a gentleman from Montana the other day in the railroad cars who asserted, positively, that lixiviation had been a complete failure wherever introduced, and smelting was the only process by which ores could be reduced successfully and profitably. I suggested, mildly, that amalgamation had produced, and was producing, many millions of gold and silver in Nevada, Utah, and even in Montana; but what effect could I expect by quoting to a business man the fact that two lixiviation mills were in actual operation in the United States?

Now to return to the Russell process. It is all right in theory; its technical points have been worked out to perfection, but it labors under the odium of many failures that have nothing whatever to do with the process itself. The successful introduction of new metallurgical processes seems to be more difficult in the United States than in Europe. The management of paying mines in this country is generally very conservative and not given to expend money for experimental purposes. The general managers are rarely men of professional education, and are incompetent to pass judgment on the merits of a new process. For this reason it is difficult to introduce a new process with first-class mining companies having the necessary means of putting up a first-class plant. On the other hand, if a silver mine does not pay the manager is generally eager to try a new process that promises a great saving in the cost of reduction; but in most cases he can not provide the necessary funds for erecting a perfect plant.

In my book, "The Lixiviation of Silver Ores with Hyposulphite Solutions," I have already pointed out why the Russell process was a financial failure at Silver Reef, Utah; Bullionville, Nev.; the Flagler Reduction Works, and the Sierra Grande Mill, Lake Valley, both in New Mexico. In the first three cases, low grade tailings were treated considered worthless for extraction by any other process. The failure at Lake Valley was due entirely to a badly constructed crushing and roasting plant, built by a contract given to the lowest bidder. At Cusihuiriachic, Mexico, the Russell process was a success under the management of Mr. Ellsworth Daggett. His successor immediately abandoned the process, simply because he wanted to save the payment of royalty, his whole management being noted for a pound foolish and penny wise policy. The mill was lately destroyed by fire. The Sombrerete mill, Zacatecas, Mexico, especially built for use of the Russell process by W. R. Eckart, of San Francisco, under the management of Mr. Clarence King, has been one of the most disastrous failures ever recorded. Here again the trouble was not with the Russell process, but was caused by a defective crushing plant that could not be run for a single day without some serious breakdown.

It is hardly worth while to mention a few other cases where the Russell process failed for similar reasons as those quoted above.

The introduction of the Russell process at Aspen, Colo., under the management of Mr. E. R. Holden, of Denver, will mark a new era in lixiviation. Mr. Holden, with the assistance of Mr. E. B. Kirby, M. E., has been experimenting with Aspen ores for over a year. As a final test, 50 tons of ore were brought to the Ontario mill, Park City, Utah, and roasted there in a Stetefeldt furnace. The results were so favorable that Mr. Holden closed a contract with the Russell Process Company for the exclusive right to use the process on Aspen ores. A mill of 100 tons capacity—for which plans and specifications will be drawn this winter—is to be erected near Aspen in the spring of 1891. This mill will be the first model lixiviation mill ever put up in this or any other country.

In spite of many failures, confidence in lixiviation is by no means dead.

A large plant is now in course of construction in Colorado. Unfortunately, it is again a case of a badly designed mill, especially so far as the crushing plant is concerned. When this mill starts, I fear another failure will be unjustly placed at the door of lixiviation.

In conclusion I will say, the Russell process requires much more skill and attention than either ordinary lixiviation or amalgamation. So many variations of treatment being possible, much experimental work is needed to establish the most profitable method for a given ore. This experimenting can not be done in the laboratory on a small scale, but must be carried out in the mill. If ore of uniform character is supplied from one mine to the mill, it is easy enough to establish a proper *modus operandi*. For a custom mill, drawing its supply from different sources, the ores are best mixed, as is done in smelting works to produce as uniform a mixture as possible.

I hope these remarks will be sufficiently clear to show to the readers of your journal the present status of the Russell process. I consider the process is now in the period of a critical transition; but I have no doubt of its final financial success.

C. A. STETEFELDT.

SAN FRANCISCO, Sept. 21, 1890.

NOTES ON THE BESSEMER PROCESS.*

American Bessemer practice is characterized by large outputs, low silicon and low initial temperature. Outputs of 852 tons in 12 hours, of 1,639 in 24 hours, of 8,549 per week, of 36,232 per month and of 318,635 tons per annum have been made from a pair of 10-ton vessels and a single casting pit, the average output for the whole year having been in one works about 118 heats per 24 hours, or a blow every 12 minutes.

A single rail-train has turned out 2,503 rails in 12 hours and about 19,392 in a week, and 660 tons in 12 hours, 1,417 in 24 hours, 6,766 in one week, 28,491 in one month and 260,881 tons in one year. This last represents an average output, taken over the whole year, of 489·5 tons per shift, 979 per day, or 5,384 per week.

While some managers prefer to have 2 or 2·25 per cent. of silicon in their vessel-charge, most mills have less than 1·75 per cent., and in some the silicon habitually lies between 0·64 and 0·80 per cent., with less than one per cent., of manganese. Even in these cases the iron leaves the cupolas rather cool, one part of coke being used to about 12 of iron. The loss for a month at a time is less than eight per cent., and less than 16 pounds of coal per 2,240 of ingots is used for heating vessels and ladles.

Low-silicon pig is cheaply made, and it permits large output, accurate blowing, small proportion of silicon in the steel, small loss of weight in conversion and small consumption of refractory materials, of steam for blast and of labor. It can be used only when blow follows blow quickly.

The shortness of our heats is due to low-silicon and not to heavy blast-pressure. Witness the fact that the consumption of coal for steam is less than 206 pounds per 2,240 of ingots in some of our works, while in some lately built and admirably managed European works it is 532 pounds, or two and a half times as much.

The short intervals between heats are due to good installation, especially to the use of top-supported and easily turned cranes and to high organization of labor.

Our large outputs should not be expected to lessen the life-work of the machinery, because they are due not to swifter motion of the machinery, but to shorter intervals of idleness. The cost of repairs and the actual endurance of machinery agree with this view. The machinery in some of our oldest works, erected 18 years ago and ever since running rapidly, is still in use, and apparently good for as much more service. Even some of the machinery erected in the original experimental works at Troy and Wyandotte in 1864 is still in active use, and little the worse for wear. As machinery is habitually discarded not when worn out but when antiquated, the greater the daily output the more work will it do in its useful life.

The labor charges are lessened by large outputs, because, though the number of kinds of things to be done is constant, the number of workmen is larger, and the additional men are in large part less expensive than the highly skilled nucleus needed, whether output be large or small. Thus the average price of a day's labor is lessened. In support of this view I find that over 50 per cent. of the employés of some of our Bessemer works have practically the pay of laborers; while the data at hand indicate that the proportion of unskilled men is much less in the leisurely European works.

Further, the greater skill due to the smaller range of work, which each man has in case of large output; the shorter slack intervals between repetitions of the same work; the smaller ratio of the fixed labor charges, and of the "fractional excess" of labor to the total, lessen the labor consumption per ton of product. More rapid running might at first suggest more rapid and hence more fatiguing motions on the part of the men, and hence an increase in the labor consumption; but on closer view it is seen rather to mean more men moving at the same old rate, improved mechanism, and fuller substitution of machine for muscular power.

In short, great output should lower both the average rate of pay and the quantity of labor per ton of product.

Direct comparisons are difficult, because the labor-consumption is affected by many other elements beside the speed of working. Further, the limits of the Bessemer department are set very differently by different accountants. These sources of variation may in themselves change the apparent labor-consumption by more than 100 per cent.

Taking into account these apparent elements of difference, I find that the labor consumption at four European works exceeds that at our rapid Bessemer works by, on an average, 18 per cent.

The following numbers, when the difference between the American and European rates of pay is taken into consideration, indicate that our labor consumption is below the foreign:

COST OF LABOR PER TON OF INGOTS.

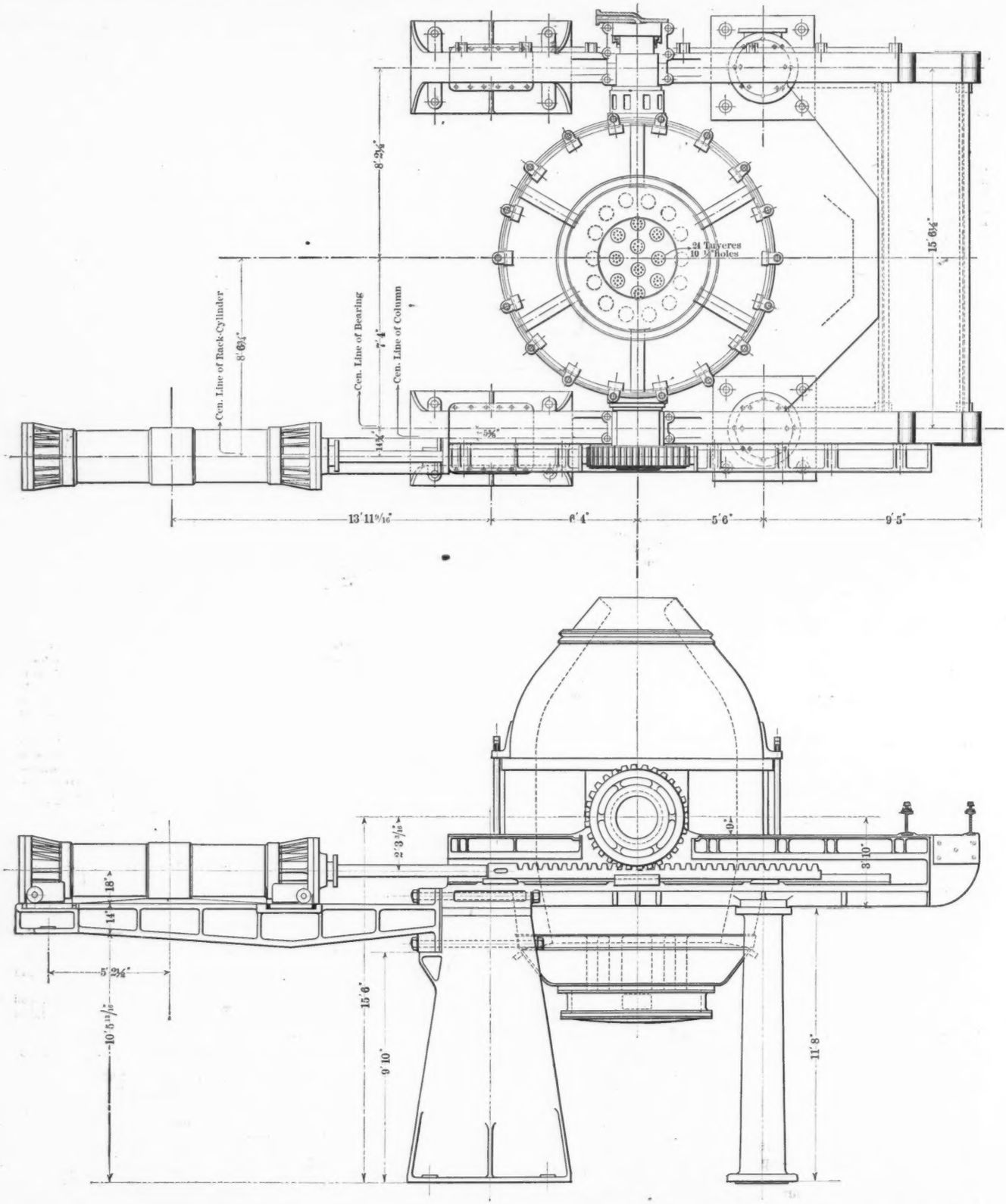
	Direct metal.	Cupola metal.
American.		
1889. Very rapid work, all doubtful classes of labor included	$0.95	$1.18
Great Britain.		
1886. Snelus (apparently direct metal)	0.75	....
1888. U. S. Labor Commissioner (not stated whether direct or not)	.... 0.56	....
1889. U. S. Labor Commissioner, " " "	.... 0.65	....
The Continent.		
1889. U. S. Labor Commissioner	0.44	0.85

I find neither good reason to think that rapid running should injure quality nor evidence that it does. Indeed, it can occur only when all conditions as to temperature, etc., are favorable to good quality. Our blowing is accurate. Only as regards teeming need any injury to quality be feared from rapid work, and the specific evils which hasty teeming should cause, blow-holes, unsoundness, etc., leading to cracked and spongy ingots, and hence to a large proportion of second-quality rails, are not found. The proportion of second-quality rails is often well below 0·5 per cent., and even for a whole year may not rise above 0·5 per cent. While rapid running allows no time to humor peculiarities of individual heats, by compelling uniformity, it tends to prevent them. The uniform-

* Abstract of a paper read before the Iron and Steel Institute, October, 1890, by H. M. Howe.

ity of the work is vouched for by that of the carbon-content of the steel, which varies within extremely narrow limits, and by the small proportion of butt-ingots made, only about one per cent.

The character of our Bessemer practice is due jointly to that of our workmen, both native and foreign born; to the enormous demands and



easy conditions of rail-reception, and to the direction and traditions which Holley and his group of personal friends established.

The Holley type of plant has been adhered to. The iron is habitually remelted in very large cupolas 8 to 10 feet in diameter, 14 to 24 feet high inside, and melting 16 tons an hour apiece, with a fuel ratio of 1 : 12, falling occasionally to 1 : 15, or, as a *tour de force*, even to 1 : 20.

Owing to the variation in the proportion of silicon and sulphur, the use of direct-metal tends to cause injurious variations in the temperature of the blow and in the proportion of sulphur, leading to increased proportion of second-quality rails, of butt-ingots, and of converting-mill scrap; to increased consumption of manganese, steam, refractory materials and moulds; to inaccurate blowing, and to skulling in vessels and ladles. These drawbacks are thought by many to outweigh the saving in the use of direct-metal, estimated at from 50 cents to $1 per ton. Jones' metal-mixer promises to turn the balance, as in the cases studied it lessens the variations of composition by 43 and 55 per cent. in case of silicon and sulphur, respectively. In some 108 successive casts the silicon lay between ·68 and 2·1 per cent., and the sulphur between 0 and 0·048 per cent.

The tendency is still toward the use of larger vessels; some newer on

are to hold 15 tons each. Symmetrical and very roomy vessels, with some 65 cubic feet capacity per ton of charge, are used, and slop very little.

Dish-bottoms are generally used, often with tiles set on end between the tuyeres.

The average life of the bottoms is usually about 14 to 20 heats, but sometimes as much as 28 heats.

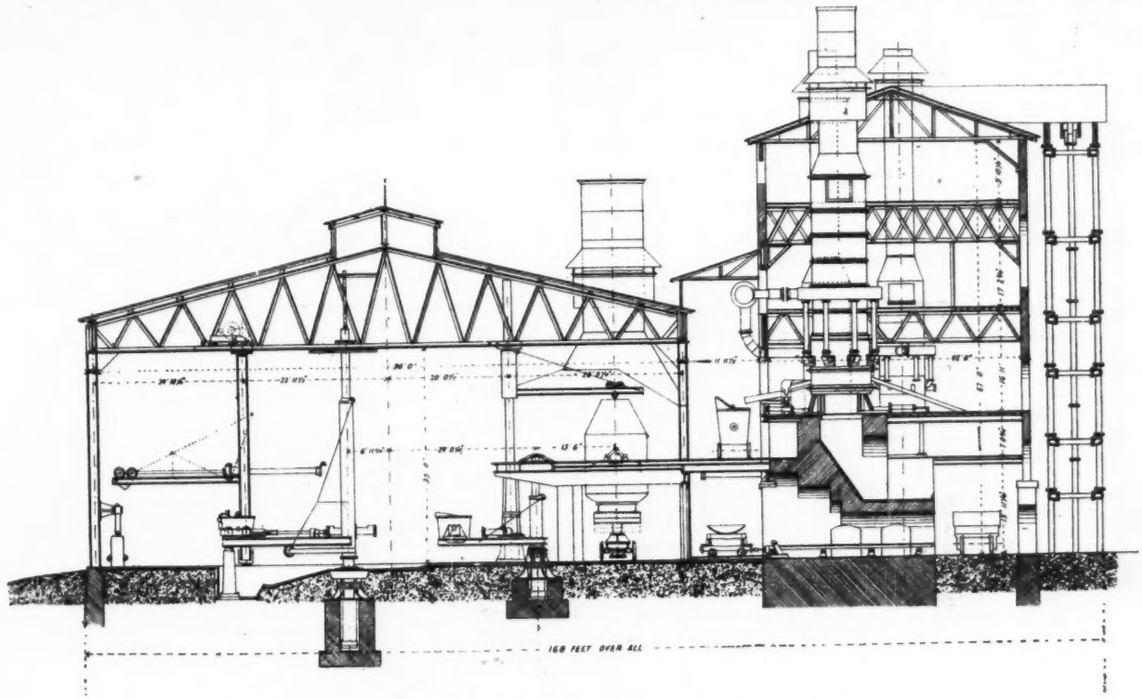
The average life of the ladles is usually about 25 heats, but sometimes as much as 40 heats.

The moment for stopping the blow is judged by the eye, without the spectroscope. The temperature of the blow is controlled jointly by the use of scrap iron and of steam introduced along with the blast.

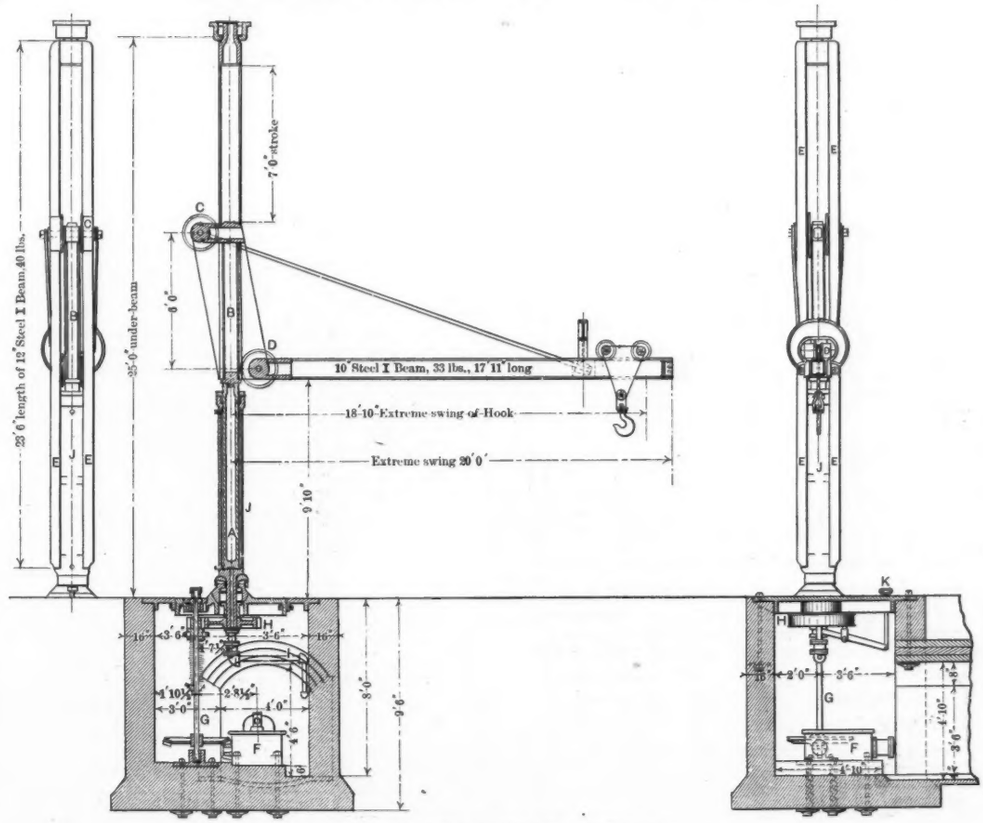
The cranes are always top-supported. The Worthington crane, formerly used exclusively, is giving way fast to the Wellman.

The engines, both blowing and rolling, are usually non-compound, but compound pumps are used.

The ingots are cast from the top in unsplit moulds, and transferred



Section of New Bessemer Steel Works, Cambria Iron Works.



Wellman's Three-Ton Ingot Crane.

The average life of the moulds is usually about 65 to 70 heats, but sometimes as much as 87 heats.

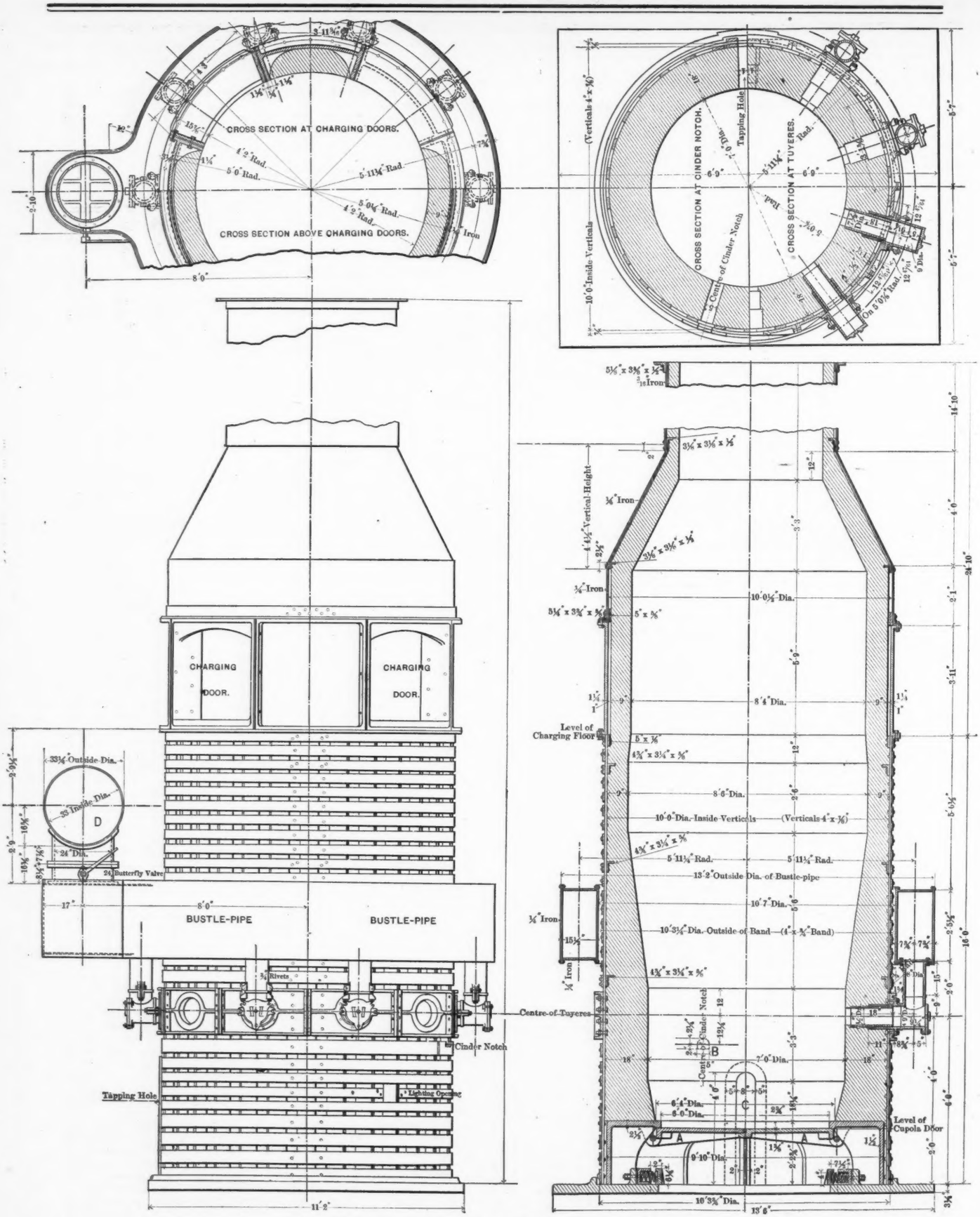
The average life of the nozzles is usually about 2 to 4 heats, but sometimes as much as 7 heats.

The average life of the stoppers is usually about 2 to 4 heats.

Vessel linings last a year, or say, as a maximum, 30,000 heats.

while still hot to common furnaces or to Hainsworth pits, and only rarely to Gjers pits, which are not liked here. The loss of weight in soaking and rolling is as low as 1·5 and even 1 per cent.

The ingots are always rolled, not hammered, and almost always in three-high mills, to blooms about seven inches square, usually in 11 passes. The blooms are rolled, sometimes with, sometimes without, reheating, to



American Anthracite Cupola for the Bessemer Process.

rails in 11 more passes, almost always in three-high trains. Many ingenious and very effective mechanical appliances are used at the rail-trains. At the blooming trains the old Fritz-Holley arrangements are still generally used.

Even when turning out about a thousand tons a day, only two men may be actively occupied at the blooming and five at the rail-train, beside the engineers and spell-hands.

Fig. 1*A*, and table I. show the rate of removal of the non-ferrous elements during a blow at the South Chicago works, and the composition of the slag at corresponding intervals. For comparison I reproduce

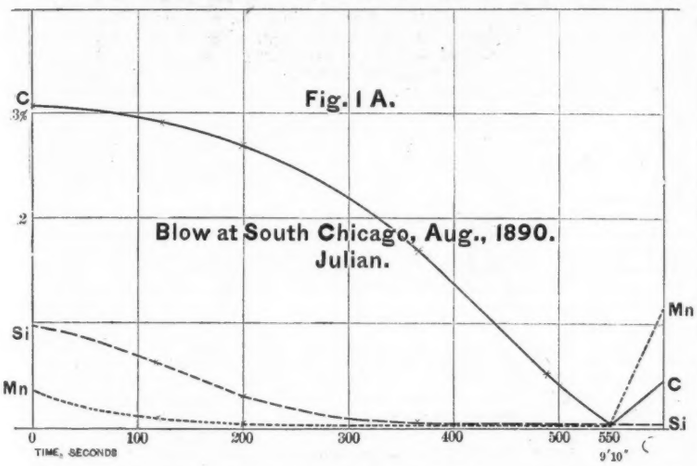
TABLE I.—COMPOSITION OF METAL AND OF SLAG AT DIFFERENT STAGES OF A BESSEMER BLOW, BY MR. FRANK JULIAN, SOUTH CHICAGO.

	METAL					SLAG								
	C.	Si.	S.	P.	Mn.	SiO_2.	Al_2O_3.	FeO.	Fe_2O_3.	MnO.	CaO.	MgO.	P.	S.
Initial	3·10	0·98	0·06	0·101	0·40	....	....	....	....	....	....	....	....	....
2 min. 0 sec	2·94	0·63	0·06	0·104	0·09	42·40	5·63	40·29	1·31	6·54	1·22	0·36	0·008	0·009
3 min. 20 sec	2·71	0·33	0·06	0·106	0·04	50·26	5·13	34·24	0·96	7·90	0·91	0·34	0·008	0·009
6 min. 3 sec	1·72	0·03	0·06	0·106	0·03	62·54	4·06	21·26	1·93	8·79	0 88	0·34	0·010	0·014
8 min. 8 sec	0·53	0·03	0·06	0·107	0·01	63 56	3·01	21·39	2·63	8·88	0·90	0·36	0·014	0·008
9 min. 10 sec	0·04	0·02	0·06	0·108	0·01	62·20	2·76	17·44	2·90	13·72	0·87	0·29	0·010	0·011
Spiegel	4·64	0·35	0·00	0·139	14·90	....	....	....	....	....	....	....	....	....
Steel	0·45	0·038	0·059	0·109	1·15	....	....	....	....	....	....	....	....	....

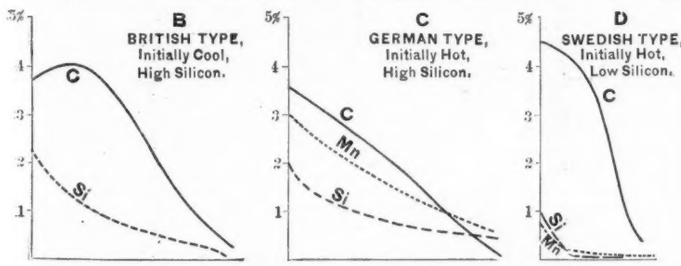
NOTE.—The charge consisted of 21,500 pounds of molten metal of the composition given above, plus 1,000 pounds of steel scrap, containing about C, 0·36; Mn, 0·97; Si, 0·06; P, 0·10; S, less than 0·08. After blowing 9 minutes 10 seconds 2,500 pounds of spiegel were added, and the vessel was again turned up for 10 seconds. The fifth sample of metal was taken before adding the spiegel, the fifth sample of slag after adding spiegel. The blow was interrupted for adding spiegel at the first indication of the drop of the flame.

diagrams representing the typical British, German, and Swedish Bessemer blows in our text books. Time permits me to notice but a few points.

As might be expected, the small quantity of silicon and manganese present does not suffice to prevent the pretty rapid oxidation of carbon



from the very first, in spite of the low initial temperature. The high initial temperature in the German and Swedish types of course permit carbon to burn from the beginning, while, in the British type, the large quantity of silicon and the low initial temperature check the combustion of carbon so fully at first that the proportion of carbon in the metal



actually increases, thanks to the oxidation and removal of silicon, manganese and iron. I here follow the tradition that, as the temperature rises, the affinity of oxygen for carbon increases relatively to its affinity for silicon, iron, and manganese. There is one point, however, that is at first a little surprising. As there is much more silicon than manganese in the South Chicago iron, we might expect the silicon to be removed at first correspondingly faster than the manganese. This is not the case, however. The ratio of the removal of silicon to that of manganese is actually lower than in the Swedish type. If we turn to the composition of the slag, we see an explanation. The slag is initially very rich in ferrous oxide, and contains rather little silica: it is relatively basic. In the presence of a relatively basic slag, oxygen tends to unite with silicon and increase the proportion of acid, rather than to unite with metal and increase the proportion of base.

But we have only removed our difficulty one step. Why is our first slag so ferruginous, so basic? I am not yet prepared to say whether it is because the bath of metal is shallow, so that the iron-oxide formed at the tuyeres is not fully reduced in passing up through the metal, or because there is so little manganese that iron oxidizes very readily, or because the temperature is low, and therefore the carbon attacks the iron-oxide formed rather feebly.*

Electric Safety Lamp.—The portable safety lamp devised by M. Gustave Trouvé, with a primary battery of surcharged bichromate of potash, is now employed in the French Government powder magazines at Servan-Livry and at Ripault, as well as in the military artillery schools, the Paris Gas Company and the fire brigade at Paris and the Italian navy. The current furnished by this lamp is 1·5 ampères at 11·4 volts, or 17·10 watts during three hours, or a total of 51·3 watt hours. This corresponds to a light of 4·2 c. p. for three hours or 1 c. p. for 12 or 13 hours, which is found considerably superior to that of the usual type of miners' lamp. The weight of the lamp and cost of maintenance are not given.—*Iron and Coal Trade Review.*

* The Fig. 1 and table II. are based on a series of analyses made for this paper by Mr. Frank Julian, the chief chemist of the South Chicago Works. For these, and for his kindness in obtaining the samples and attending to the many laborious details of the observation, the warmest thanks of the profession are due him.

A THIRTY YEARS' RETROSPECT OF THE IRON TRADE.

Written for the Engineering and Mining Journal by William Kent, M. E.

(*Concluded from page* 386.)

The most remarkable feature of the present period is the fact that notwithstanding the decrease in railroad building, from 12,872 miles in 1887 to 5,155 miles in 1889, and the corresponding decrease in the production of steel rails, from 2,396,397 tons to 1,704,868 tons, the production of pig iron has increased from 7,187,206 tons in 1887 to 8,516,079 tons in 1889.

This fact indicates that the fluctuations in railroad building, which were apparently the controlling influence on the trade in the twenty years from 1868 to 1887, inclusive, have now ceased to have such an influence. This is confirmed by the following figures showing the percentage which the total amount of rails made bears to the total amount of pig iron made:

Year.	Per cent.	Year.	Per cent.	Year.	Per cent.	Year.	Per cent
1868	31·6	1874	27·1	1880	34·0	1886	28·1
1869	31·0	1875	35·0	1881	39·7	1887	33 3
1870	33·2	1876	42·6	1882	32·6	1888	21·6
1871	40·6	1877	33·0	1883	26·4	1889	20·0
1872	35·0	1878	33·8	1884	24·9		
1873	31 8	1879	36·2	1885	24·1		

The total amount of rails made decreased from 2,396,397 tons in 1887 to 1,704,868 tons in 1889. Making the rough estimate that a ton of steel rails requires for its production about 1·15 tons of pig iron, the pig iron consumed in making these rails would be, for 1887, 2,755,857 tons, and for 1889, 1,960,598 tons. Subtracting these figures from 7,187,206 tons and 8,516,079 tons, the total pig iron made in 1887 and 1889 respectively, we have 4,431,349 tons and 6,555,481 tons as the amount of pig iron made in these years that was not needed for the production of rails, an increase of nearly 48 per cent. in two years.

The statistics are not complete enough to inform us in what lines of industry this great amount of iron was consumed, nor in what ones this great increase took place. There is no single industry in the country which calls for any large consumption of iron at all comparable with that of rail making, but there are a multitude of smaller industries which do not fluctuate in anything like the manner of the steel-rail industry, which are all at present highly prosperous, and which use a steadily increasing amount of iron. Among these are the making of wire for fences, cables and telegraphs; nail making; sheet-iron for roofing, tanks, etc.; steel plates for boilers; machinery building; car building; structural and architectural iron making; bridge building; making of conduits for cable railways; and making of iron pipes and tubes. The aggregate demand from all of these industries constantly increasing, without violent fluctuations, they act as a balance wheel to the trade, overcoming the tendency to alternate booms and depressions due to the fluctuations in the rail industries.

The following figures show, as far as the statistics inform us, how the total production of iron is divided into classes, for the year 1889 only:

PIG IRON.	Net tons.
Total pig iron produced	8,516,079
Spiegel, included in above	85,283
Bessemer pig iron	3,529,584
Other kinds, including forge and foundry	4,901,212

ROLLED IRON AND STEEL.	Steel.	Iron.	Total.
Rails	1,694,610	10,258	1,704,863
Wire rods	393,053	14,460	407,513
Nail plate	201,634	88,904	290,538
Other plates and sheets	331,283	471,193	802,476
Other rolled products	658,394	2,001,570	2,659,964
	3,278,974	2,586,385	5,865,359

If we assume that 15 per cent. of the total production of rolled products will cover all the wastes in the conversion of pig iron into these products, we have 6,745,163 tons as the amount of pig iron required for the production of rolled products, and this amount, subtracted from the total amount of pig iron produced, leaves 1,770,916 net tons as the approximate amount of foundry iron used for castings. No account is here taken of direct process blooms, from which a small portion of the rolled iron and steel was made, nor of the variation in stocks of iron at the beginning and end of the year, both of which are relatively insignificant quantities. The statistics do not show what were the principal shapes in which the 1,770,000 tons of foundry iron and the 2,659,000 tons of "other rolled products" entered into final consumption.

Glancing at the prices of pig iron for the seven years, 1883 to 1889, inclusive, as shown in the diagram, it is seen that there is no other period of seven years in the 30 under discussion in which the prices remained so steady. There is an evident tendency to a decrease in prices, and the prices in 1889, a year of great prosperity in the trade, were almost as low as in 1878, the year of greatest depression. This tendency to decrease is undoubtedly caused by the great development of new mines, especially in the Lake Superior region, in the South and in Cuba, by the decrease in cost of transportation, and by the improvement in furnaces and in methods of handling material. The consolidation of the iron industry into fewer plants, with the consequent economy in running expenses, is also a large factor in the decrease of cost of production.

Judging of the future by the past, the diagram of pig iron production would indicate that the iron trade is now at a pinnacle of prosperity from which there must be a decline in a very short time; but judging from present indications of the actual condition of the trade and of the general prosperous condition of the country, together with the low prices now pre-

vailing, there is not the slightest indication of any decline. The present outlook is one of continued increase in production and in general prosperity.

Much has recently been written by others concerning the prospect that America will soon be able to compete with other nations in production of pig iron for export, but the writer can see no probability of the growth of any extensive trade of this kind for many years to come. The statement made by Sir I. Lowthian Bell after his visit to America in 1876, and his study of the geographical situation of our iron and coal mines relative to the seacoast as compared with other nations, that "labor being on anything like equal terms, it is a physical impossibility that iron can be made more cheaply in the United States than in England," is still true. Our chief supply of fuel now comes from the Connellsville region in Pennsylvania and the Pocahontas region in Virginia, over 300 miles from any good furnace location near the seacoast, and our ore supply for furnaces on the Atlantic coast must also be transported a great distance. The statistics recently published by Mr. Carroll D. Wright, Commissioner of Labor Statistics, show that the labor cost of producing iron ore, coal and limestone and the conversion of them into iron, lower in Europe than in this country. Until there is either a great reduction in price of labor in this country, a rise in wages in Great Britain, Belgium and Germany, or an exhaustion of the ore and fuel supply accessible to those countries, this condition must remain. In fact, there has been a constant increase in the iron production of these countries, and a constant increase in their iron exports, except in their exports to the United States.

Mr. Wright's figures show that the cost of producing a ton of pig iron, not including interest, insurance, depreciation of value of plant and charges for freight of product to place of free delivery, is as follows, for foundry forge and Bessemer irons (not charcoal):

63 Northern U. S. furnaces, range of cost	$12.17 to $17.79
25 Southern " " " "	8.55 to 12.91
8 British " " " "	7.68 to 10.89
11 Continental " " " "	7.73 to 13.43

The Southern furnaces showing the low cost of $8.55 and upward are in locations far removed from the seacoast, and a considerable sum, $2 to $3, would have to be added for railroad freight to a seaport, if it were intended to produce these irons for an export trade.

The probable establishment of the tin plate industry in this country is likely to result in an increase in the demand for pig iron here, and a decrease of the demand in Great Britain for pig iron for making tin plate there, and this impending change in the location of the tin plate industry from Wales to Pennsylvania is likely to cause an increase in prices of pig iron here relative to prices abroad. This relative change in prices of pig iron here and abroad may act for some time to come as a preventive of our export trade in pig iron, and tend to stimulate the British exports to other countries than the United States. It is glory enough for the iron and steel industry of the United States to have achieved its own complete independence of foreign producing nations and with the prospect of a continually increasing demand in our country, we can afford to let Great Britain, Germany and Belgium compete with each other for what remains to them of the "markets of the world."

The United States is not, however, entirely independent of foreign nations for its ore supply, about six or seven per cent. of the ore used being imported, the chief sources being Spain and Cuba. There is a prospect of a considerable increase in our imports of iron ore, as new mines are being opened in Cuba which promise to produce a very high grade of ore in large quantities. The statistics of ore production are not complete, but the following table is interesting in showing the growth of our principal source of domestic supply, in comparison with the amount of ore imported:

Year.	Production of ore in Lake Superior region. Gross tons.	Iron ore imported. Gross tons.
1879	1,414,182	284,141
1880	1,987,598	493,408
1881	2,321,315	782,887
1882	2,943,314	589,655
1883	2,352,288	490,875
1884	2,518,048	487,820
1885	2,466,372	390,786
1886	3,568,022	1,039,433
1887	4,730,577	1,194,301
1888	5,063,693	587,470
1889	7,292,754	853,573

The total production of the country in 1889 was probably in excess of 1,300,000 gross tons.

Many claims have been made recently that the Southern States are going to become the chief center of iron production of the United States. The growth of the iron industry in these States has certainly been phenomenal, but it is the writer's opinion that there will hereafter be no one great center of the industry, but that there will be a number of centers widely separated, each supplying chiefly its own surrounding territory and competing for trade with the others only on the border ground or in neutral districts. The following figures show the growth of certain districts during the past five years, and from them some indication may be seen of the tendency to growth in the future:

	Pig iron produced—net tons.				
	1885.	1886.	1887.	1888.	1889.
Total, United States	4,529,869	6,365,328	7,187,206	7,268,507	8,516,079
" Pennsylvania	2,445,496	3,293,289	3,684,618	3,589,186	4,181,242
" Allegheny County, Pa	585,696	737,124	897,849	890,569	1,293,435
" Ohio	553,963	908,094	975,539	1,103,818	1,215,572
" Nine Southern States (Ala., Tenn., Va., W. Va., Ky., Ga., Md., Tex., N. C.)	712,835	875,179	929,436	1,132,858	1,566,702
" Alabama	227,438	283,859	292,762	449,492	791,425

	Increase in 5 years. Tons.	Percentage of increase.
United States	3,986,210	88
Pennsylvania	1,735,746	71
Allegheny County, Pa	707,739	121
Ohio	661,609	119
Nine Southern States	853,867	120
Alabama	563,985	252

It is thus seen that while the percentage of increase of Alabama was phenomenal, its total actual increase of production in five years was less than that of one county in Pennsylvania, and but little over one-third of that of the whole State of Pennsylvania, and the increase in the State of Pennsylvania was more than double that in all the nine Southern States taken together. New iron works are being established as far north as Duluth, Minn., and others are projected in Colorado. The iron and steel production in Cook County, Ill., including Chicago, has also rapidly increased and Chicago is likely to be as great a center of the trade as Pittsburgh. This paper, however, professes to be a retrospect and not a prophecy, and if in what has been written above the writer has given a clear view of the course of the trade for the past 30 years, his object is accomplished.

THE DEVELOPMENT OF AMERICAN BLAST FURNACES WITH SPECIAL REFERENCE TO LARGE YIELDS.*

The development of blast furnace practice in America in the direction of large yields is mainly the history of our working since the year 1880, as the advancement that has been made in the last decade is greater than that in the third of a century previous. A new era in the manufacture of pig iron began in 1880 with the putting in blast of the Edgar Thomson furnaces. These furnaces at once leaped to the front as pig iron producers, and have maintained that position—with but one brief interruption—ever since. The Struthers furnace, in Ohio, was one of the first to attract attention in the matter of large outputs. This furnace was 55 feet high, 16 feet diameter of bosh, 9 feet hearth, stock line about 8 feet 6 inches. The fuel was raw coal. This furnace, in December, 1871, made 1,602 tons of iron, and in January, 1872, made 1,642 tons. The best output in a single week was 400 tons. By March, 1876, the product had increased to 2,032 tons. The good results obtained at this furnace were largely due to the fact that the manager, Mr. Thomas W. Kennedy, broke away from the traditional practice of regulating the quantity of blast by the pressure gauge, and substituted instead the revolutions of the engine—a practice that obtains to-day.

The Isabella No. 1 furnace, in Pittsburg, 75 × 20 feet, was "blown in" in January, 1876, and continued in blast until May, 1880, making a total output of 117,575 tons of pig iron, or an average of 2,264 tons per month. The consumption of coke per ton of iron averaged 3,000 pounds. The temperature of blast ranged from 1,000 to 1,100 degrees, with a blast pressure of four to six pounds. No record was kept of the amount of air blown. The Lucy No. 2, Pittsburg, was built in 1877, 75 × 20 feet. Diameter of hearth, 9 feet; cubical capacity, 15,400 feet. As early as 1878 this furnace had made a monthly output of 3,286 tons, on a coke consumption of 2,793 pounds per ton of iron, and in one week shortly afterward made 821 tons. It continued in blast for nearly 34 months, making in this time an output of 92,123 tons, or an average of 2,737 tons per month, on an average coke consumption of 2,865 pounds per ton of iron. For the first 12 full months the output was 33,552 tons, on a coke consumption of 2,850 pounds. The ore mixture yielded in the furnace 60 per cent. iron. The work that was done at this furnace was unquestionably the best, all thing considered, that had been accomplished prior to the starting of the Edgar Thomson furnaces. The Lucy furnace of 1877 is shown in Fig. 1.

Furnace "A" of the Edgar Thomson works was originally a charcoal furnace at Escanaba, Mich., but was removed and erected on its new foundations in 1879. The dimensions of this furnace, as will be seen by a reference to Fig. 2, are as follows: height, 65 feet; diameter of bosh, 13 feet; diameter of hearth, 8 feet 6 inches; cubical capacity, 6,396 feet. Six tuyeres, 4 inches in diameter, were used; these, projecting 7 inches inside the crucible, made the efficient diameter of hearth 7 feet 4 inches. The tuyeres were placed 5 feet 6 inches above the hearth line. In Vol. VIII. of the "Transactions of the American Institute of Mining Engineers," a description is given of the "blowing in" and subsequent working of this furnace, by Mr. Julian Kennedy, who was then manager of the works. This furnace was "blown in" in January, 1880. The ore mixture consisted of Tafna, McComber, Pilot Knob and Somorrostro ores, yielding in the furnace 54·5 per cent. iron. The output of the first full week was 442 tons, and reached 537 tons for the fourth week.

The best week's output was 671 tons. The blast was heated to an average temperature of 1,050 degrees, the utmost that the stoves would furnish; the pressure at the tuyeres was 6¼ pounds. The average coke consumption was 2,400 pounds per ton of iron.

The volume of air forced into this furnace was 15,000 cubic feet per minute, or as much as was used elsewhere for furnaces of more than twice the capacity. The results obtained were surprising, and it is no wonder that the pig-iron-making world regarded them with an astonishment amounting, in many cases, to incredulity. Considering the cubical capacity of the furnace, the rate of driving was certainly excessive; and, that the results on fuel were so low, as compared with the subsequent consumption on larger furnaces where the same practice was employed, is mainly due to the narrow furnace stack. These fuel results, as I shall presently show, were much lower than any obtained from the larger furnaces in the next five years; and, had a distinction been then made between rapid driving on the one hand and excessive driving on the other, many American furnaces would have reduced their outlay for fuel enormously.

In Fig. 3 is shown a drawing of the second furnace erected at these works, of which the general dimensions are as follows: Height, 80 feet; diameter of bosh, 20 feet; diameter of hearth, 11 feet; cubical capacity, 17,868 feet.

One feature of this construction, differing from that of other furnaces then using coke for fuel, was the large hearth, providing more space for combustion. As originally planned, the hearth was 9 feet in diameter at the bottom, and sloping up to the tuyeres; but, before building, Mr. Kennedy changed the plan, so that the inwalls of the hearth would be straight, making the diameter 11 feet. There was, moreover, an increased number of tuyeres, 8 being used, and an increased elevation of tuyeres above the hearth level, all of which were necessary for rapid driving and large yields.

In another respect this furnace was well prepared by its designers for a high productive capacity, viz., in its equipment. Fire-brick stoves of the most approved type were erected. Substantially-built blowing engines were provided, and they were rendered efficient by an ample supply of boilers—a point in which other furnaces were then sadly lacking.

* Abstract of a paper read at the New York meeting of the British Iron and Steel Institute by James Gayley, Bessemer, Pa.

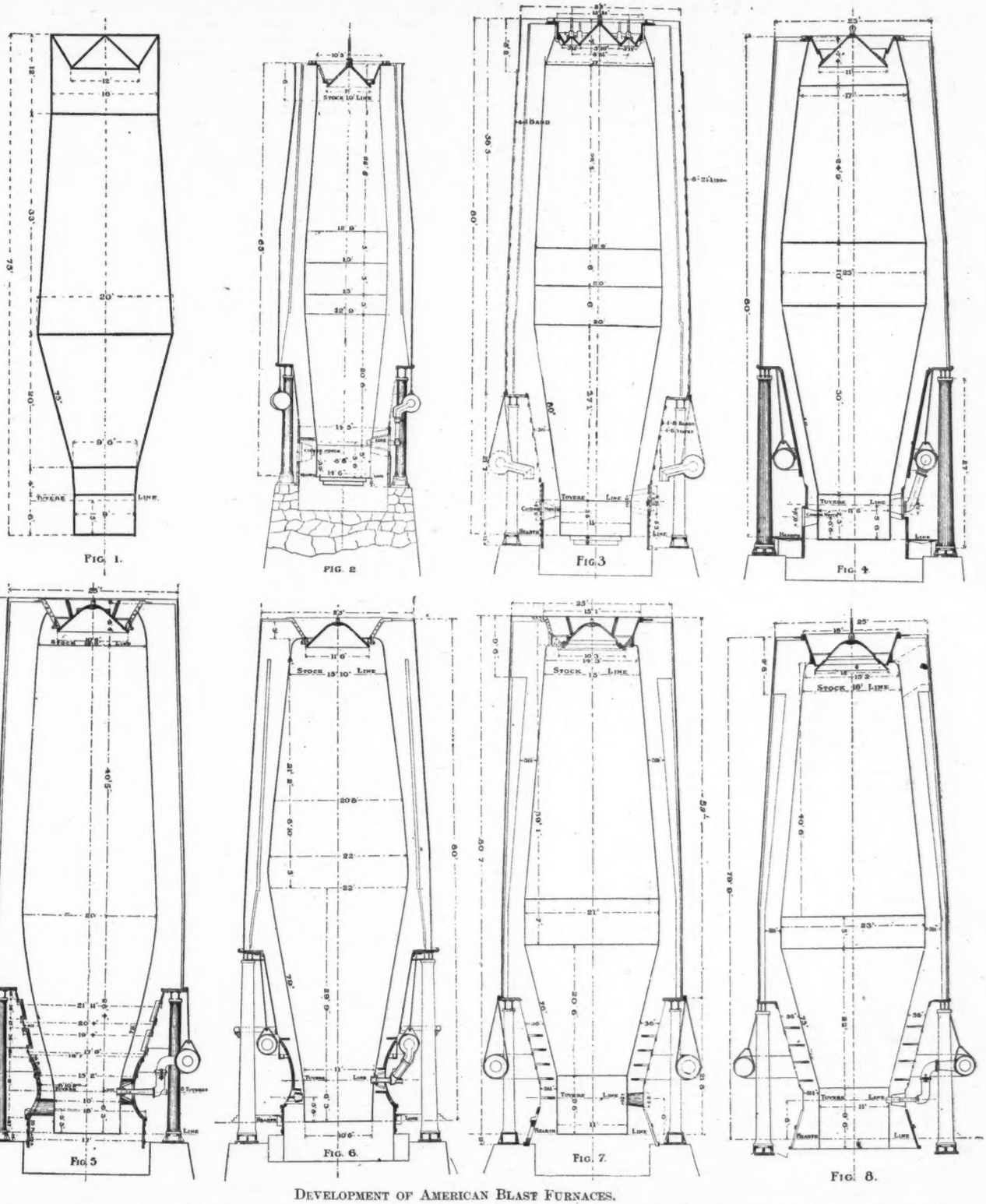
The furnace was put in blast in April, 1880. In the following month an output of 3,718 tons was made, and the next month showed 4,318 tons, thus fully justifying the claims of its designers by eclipsing all previous records. The detailed record of the work done by this furnace during the earlier months of the blast is as follows:

Months.	Tons.	Pounds coke per ton iron.
April	2,723	2,536
May	3,718	2,574
June	4,318	2,344
July	4,345	2,706
August	4,601	2,811
September	4,221	2,757
October	4,722	2,736

It will be noticed that the consumption of fuel increases as the summer months advance, being affected by the content of moisture in the atmosphere, it being nearly twice as much in summer as in winter. Another feature of the practice tending to increase the fuel consumption was the increased rate of driving; the volume of air blown having been gradually increased to 30,000 cubic feet per minute, engine measurement, taxing alike the efficiency of the engines and the stoves. However, a high productive capacity was aimed at, and an output of 4,722 tons in a month was certainly marvelous at that time. The weight of limestone was 25 per cent. of the weight of the ore. An analysis of the cinder shows:

	Per cent.
Silica	32·31
Alumina	13·20

The blast entered the furnace through eight bronze tuyeres of 5½ inches diameter, and was heated to a temperature of 1,100 degrees. The silicon in



Development of American Blast Furnaces.

the iron averaged about 2 per cent. The rapid wear of the furnace walls, through the use of such a large volume of air, gradually increased the consumption of coke to over 3,000 pounds per ton of iron. At the end of the first twelve full months the output was 48,179 tons, on an average coke consumption of 2,859 pounds per ton of iron. The second year showed an average consumption of 3.200 pounds of coke, with a decrease in yield. The upper brick of the stack having given way, the furnace was blown out after a blast of two years and five months, having made a total product of 112,060 tons, on an average coke consumption of 3,149 pounds per ton of iron.

I wish to emphasize the bearing that the practice of rapid firing, begun on Furnace A and further developed on this one, had on the general practice of this country. The large outputs obtained from this furnace by the use of a large volume of air was a matter of common knowledge; the practice of fast driving soon became the accepted one, and with our national ardor it was prosecuted enthusiastically. In every direction engines that had been running along for years at a methodical gait were oiled up and started off at a livelier pace; new boilers were added; the old iron hot-blast stoves, not supplying sufficient heat, were torn down and replaced by the more efficient fire-brick stoves. At many works rapid driving degenerated into excessive driving. True, the outputs increased: so also did the consumption of fuel, and that at a surprising rate, until it was thought well-nigh impossible to produce a ton of iron with 2,600 pounds of coke.

Mr. E. C. Potter, of Chicago, sounded the note of warning in 1885, and great credit is due to him for demonstrating that large outputs and low fuel consumption are incompatible. Since then a marked change in our practice has taken place, and the volume of air blown has been greatly diminished.

Although the practice of rapid driving has been much decried, yet in many ways it has resulted beneficially. It has brought in an equipment of hot-blast stoves, boilers, engines, etc., sufficient to accomplish a large amount of work without a constant strain on every part—a condition very rare prior to 188 —and it has also developed a construction of the furnace stack, by which larger outputs from a single lining can be obtained with less regularity in the working.

In Fig. 4 is shown a furnace of different construction from either of the preceding, it being my purpose to present successive types of construction rather than changes in the same furnace. We find this furnace constructed with special regard to the better protection of the brickwork of hearth and bosh. The general dimensions are as follows: Height, 80 feet; diameter of bosh, 23 feet; diameter of hearth, 11 feet 6 inches; stock line, 17 feet; bell, 11 feet; curbical capacity, 21,478 feet. This jacket is bolted on to the mantle. The bosh walls inside the jacket were made but 22½ inches thick, so that the cooling effect of the air currents on the jacket would prevent any very rapid wear of the brickwork.

This furnace was put in blast in 1882, and in the second month made the large yield of 6,045 tons on a coke consumption of 2,617 pounds. In the first 12 full months the output was 65.947 tons, on an average of 2,570 pounds of coke per ton of iron, thus exceeding by over 11,000 tons the best output that had previously been obtained in the same time from any furnace at these works, and with a much smaller consumption of fuel. The record for the best month during this period was 6,131 tons, on a coke consumption of 2,387 pounds per ton of iron. The amount of air blown was 27,000 cubic feet per minute, which was heated to an average temperature of 1,000 degrees. The pressure of blast at the tuyeres varied between 9 and 10 pounds. After a blast of 17 months' duration this furnace was blown out, having made a total output of 90,317 tons, on an aberage coke consumption of 2,613 pounds per ton of iron.

As illustrating the effects of an excessive volume of air, I will mention a furnace put in blast two years later—of practically the same dimensions and protected to the same extent, but blown with 33,000 cubic feet of air per minute—which made an average output of 5,000 tons per month, on a coke consumption of 3,000 pounds per ton of iron. This is the largest amount of air that I know to have been forced into any furnace. The fuel consumption is what might have been expected, as the furnace was driven at such a rapid rate that the imperfect reduction of the ores in its cooler parts necessitated the completion at atemperature sufficiently high for the CO_2 to react on the carbon.

In the next drawing, Fig. 5, is shown a different arrangement for maintaining the bosh walls. The lower part of the hearth is surrounded by cast iron plates. On the top of these rests a water-cooled corset jacket, fastened together with links, and banded at the upper and lower ends by iron bands, 6 inches wide and 1 inch thick. The wrought iron bosh jacket is dispensed with, and in its stead are two bands of water-cooled plates, covering the greater portion of the brickwork. These are held in place by bands at the top and bottom, and also by being inserted a short distance in the brickwork.

The dimensions of the furnace are shown in the drawing. The cubical capacity was 16,6t0 feet. In February, 1885, the furnace was "blown in." The volume of blast was rapidly increased until, in the following month, it reached 31,000 cubic feet per minute. The blast entered the furnace through eight tuyeres, seven inches in diameter, and was heated to an average temperature of 1,200 degrees. The pressure at the tuyeres was 8½ pounds. The average monthly output from March to August, inclusive, was 5,122 tons on a coke consumption of 2,874 pounds per ton of iron.

As this was the third blast for the same furnace (a companion furnace to that shown in Fig. 3), a comparison with the record made at the same relative time on the first blast will show the effect of different rates of driving on the fuel economy. In the first blast the coke consumption was 2,600 pounds, with a volume of air of 24,000 cubic feet per minute; in this blast it has risen to 2,850 pounds, through an increase in the volume of air of 7,000 cubic feet.

On taking charge of these works in October, 1885, I endeavored to reduce the volume of blast in order to diminish the consumption of fuel. The reductions were made slowly, until the volume was 28,000 cubic feet per minute. Many attempts were made to reduce it still further, but as each attempt was invariably met by great irregularity in the working of the furnace, further efforts in that direction were abandoned. The volume of blast was therefore maintained steadily at 28,000 cubic feet, and the temperature, which before had been quite variable, was maintained more uniformly. At the same time the cinder, which was quite basic, was made less so.

As a result of these changes the output increased to an average of 6.050 tons per month, on a coke consumption of 2,400 pounds per ton of iron.

The furnace was blown out, on account of the upper lining being destroyed, after a blast of twenty-three months. The total output for the blast was 118,000 tons, on a coke consumption of 2,705 pounds. For the first twelve full months the output was 64,998 tons, on a coke consumption of 2,677 pounds per ton of iron.

In Fig. 6 of the drawings is shown a combination of Figs. 4 and 5 in the construction of cooling jackets.

The interior shape of this furnace differs very materially from those previously shown, having been made to conform, as nearly as possible, to a furnace at the South Chicago works, which was then giving excellent results in regard to both output and consumption of fuel. The bell is increased in diameter, and the upper walls are drawn in, making a less diameter at the stock line. The bosh is 22 feet in diameter, the total height 80 feet, the cubical capacity, 18,950. There are eight tuyeres, each 5 inches in diameter.

This furnace was "blown in" in September, 1885, and in one week from starting the volume of blast was 27,000 cubic feet per minute, and was at this figure when the furnace came under my management. Within the next two months I reduced this volume to 22,000 cubic feet, which was heated to a temperature of 1,300 degrees.

The product for October was 6,320 tons, and for November 6,306 tons, on a coke consumption of 2,396 pounds. In December, the output on the decreased volume of blast increased to 6,451 tons, and the consumption of coke had fallen to 2,172 pounds. For the first twelve full months the output was 74,475 tons, on an average coke consumption of 2.250 pounds per ton of iron. During the last year that the furnace was in blast the volume of air was gradually increased to 27,000 cubic feet per minute. The inwalls were much worn, and the grade of iron had become variable; but with the increased volume of air the working became very uniform. In the last eight months of the blast the consumption of coke had risen to 2,500 pounds. After a blast of 26 months, the furnace was blown out, having made a total output of 150,374 tons on an average fuel consumption of 2,342 pounds per ton of iron. At no time in the blast did the coke consumption reach 2,600 pounds, except in the third month before blowing out. The best output obtained in any single month was 6,730 tons.

In Fig. 7 is shown the same furnace as in Fig. 5, with the bosh entirely protected by cooling plates inserted in the brickwork. The hearth was widened to 11 feet diameter. The diameter of bosh was also increased 1 foot, and the stock line reduced 15 inches. The cubical capacity of the furnace is 17,230 feet.

This furnace was "blown in" in March, 1887, and in April made 5,591 tons on a coke consumption of 2,105 pounds. In July the output increased to 6,243 tons, and in September reached 7,064 tons on a coke consumption of 1,993 pounds. The volume of air blown was 24,000 cubic feet per minute, heated to an average temperature of 1,200 degrees.

In the period extending from October, 1888, to January, 1890, the average monthly output was 7,000 tons, on a coke consumption of 2,350 pounds. During this period the volume of air had been increased to 27,000 cubic feet per minute. The temperature of blast was still maintained at 1,200 degrees. The average pressure of blast at the tuyeres was 8 pounds. On account of the brickwork in the bosh being very much worn, the furnace was blown out after a run of 2 years, 7 months, and 17 days —exclusive of the time the furnace was banked. The output for the blast was 203,050 tons, on an average coke consumption of 2,342 pounds per ton of iron.

In the next drawing, Fig. 8, is seen the same construction of hearth and bosh applied to one of our larger furnaces. In fact, the furnace just described was remodeled after this one; but for the purpose of comparing two consecutive blasts I have placed it earlier. This furnace was built in 1885–86. The total height is 80 feet; the diameter of hearth, 11 feet; the diameter of bosh, 23 feet. The bell is 12 feet in diameter, and the stock line 16 feet. The cubical capacity is 19,800 feet. The construction of hearth and bosh is the same as in furnace just described. There are seven tuyeres, each 6 inches in diameter.

The furnace was started in October, 1886. The record for the next three months is as follows:

Months.	Tons.	Pounds coke per ton of iron.
November	6,795	2,128
December	7,494	2,105
January	8,398	1,935

From January to May, inclusive, the average monthly output was 8,150 tons, on a coke consumption of 1,980 pounds. The volume of air blown was 27,000 cubic feet per minute, which was heated to an average temperature of 1,200 degrees. The pressure at the tuyeres varied from 9 to 10 pounds, and was generally the latter figure when the outputs were largest. On account of labor troubles the running of this furnace was interrupted, a stop of 67 days being made. On account of this the consumption of coke increased to an average of 2,450 pounds.

It is greatly to be regretted that our work does not show an uninterrupted blast; since our records show, in nearly every case a decrease in output and an increase in fuel consumption from 150 to 200 pounds per ton of iron, as a result of each "banking up."

The furnace was in blast—exclusive of stoppages—two years, seven months and ten days, and made in that time 224,795 tons of iron, on an average coke consumption of 2,317 pounds. The output for the first twelve full months was 88,940 tons on 2,150 pounds of coke. The furnace was relined without delay, and after a two weeks' drying out was put in blast on September 25th, 1889, just seven weeks from the time of blowing out. The constructian is the same in every particular, except that the diameter of the bosh is reduced to 22 feet, and the stock line to 15 feet 6 inches. The lining runs straight from bosh to stock line. This change reduced the cubical capacity to 18,200 feet. The same number and size of tuyeres are used. The volume of air blown is 25,000 cubic feet per minute, a reduction of 2,000 cubic feet from that used in previous blast.

Beginning with October, the record of monthly outputs and coke consumption to the present time is as follows:

MONTHS.	Tons.	Pounds coke per ton of iron.
October, 1889	6,521	2,450
November, 1889	9,097	1,897
December, 1889	10,603	1,756
January, 1890	10,536	1,737
February, 1890	8,954	1,859
March, 1890	9,941	1,845
April, 1890	10,075	1,847
May, 1890	10,035	1,884

The best output for any one week is 2,462 tons. The temperature of blast averages 1,100 degrees and the pressure 91·2 pounds. The temperature of the escaping gases is 340 degrees. An average composition is—

CO, 27·5 per cent., CO_2, 11·7 per cent.

CO, CO_2, 0·42 per cent.

Counting the time the furnace was running in the first blast, and up to the end of May, 1890, in the second blast, including also the time spent in relining, the period covered is three years and five months, and in that time this furnace has made an output of 301,205 tons, a record which is unparalleled. In the month of May this, together with a companion furnace of precisely the same dimensions, made an output of 20,192 tons, on an average coke consumption of 1,832 pounds per ton of iron. The ores used are from the Lake Superior region, and yield through the furnace 62 per cent. of iron. The proportion of limestone carried is 28 per cent. of the ore burden, and about 1,200 pounds of cinder are made per ton of iron. The average analysis of the cinder is as follows:

Silica..... 33·00 per cent.
Alumina..... 13·00 "

The stone used contained but a very small quantity of magnesia. The silicon in the iron averages 1·60 per cent., the iron being run into ladles and sent to the converting mill direct.

I shall not undertake to say what these furnaces will accomplish on an uninterrupted blast, but I believe the day is not far distant when we shall be able to show a record of 300,000 tons from a furnace in three years, and on a single lining.

In the period covered by the last decade there are three steps in the development of American blast furnace practice that might be mentioned: first, in 1880, the introduction of rapid driving, with its large outputs and high fuel consumption; second, in 1885, the production of an equally large amount of iron with a low fuel consumption, by slow driving; and third, in 1890, the production of nearly double that quantity of iron, on a low fuel consumption, through rapid driving.

In the following table I give a summary of the preceding data:

ABSTRACT OF RESULTS.

Designation of furnace.	Year in which furnace commenced the blast.	Cubical capacity.	Volume of air per minute.	Total output from blast.	In first twelve full months.			
					Output.	Average daily output.	Average coke consumption.	Capacity for one ton of iron per day.
		Cubic feet.	Cubic feet.	Tons.	Tons.	Tons.	Pounds.	Cubic feet.
Isabella	1876	15,000	....	117,575	28,000	76	3,000	197
Fig. 1	1878	15,400	16,000	92,128	33,552	91	2,850	169
" 2	1880	6,396	15,000	....	....	*71	*2,400	90
" 3	1880	17,868	30,000	112,069	48,179	132	2,859	135
" 4	1882	21,478	27,000	90,317	65,917	180	2,570	119
" 5	1885	16,680	†31,000	118,000	64,998	178	2,677	90
" 6	1885	18,950	22,000	150,374	74,475	204	2,250	92
" 7	1887	17,230	24,000	‡ 3,050	172,554	198	2,230	87
" 8	1886	19,800	27,000	224,795	88,940	244	2,150	81
" 8	1889	18,200	25,000	....	§113,000	310	1,920	59

* Estimated.
† After running nine months the volume of air was reduced to 28,000 cubic feet.
‡ The second twelve months, by reason of a continuous blast, shows an output of 83,219 tons on 2,396 pounds of coke.
§ Estimated from record made to date.

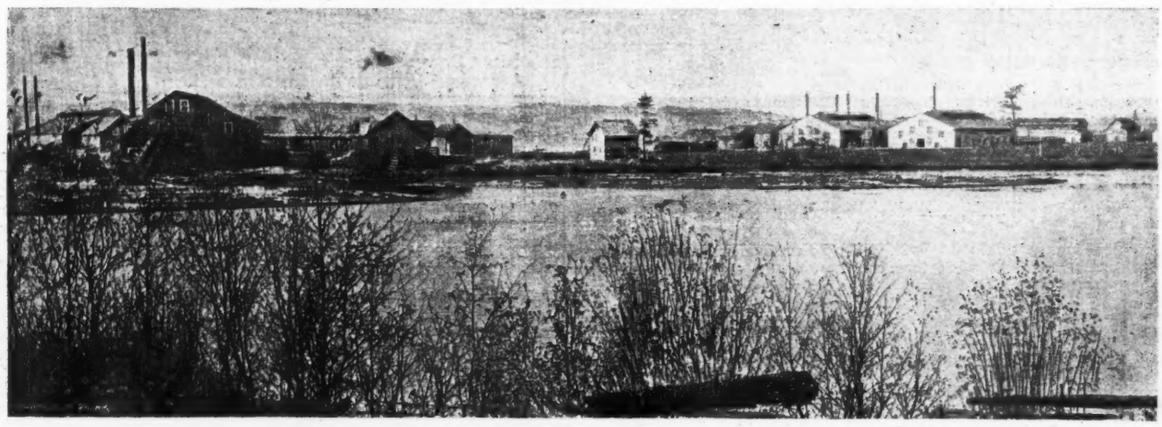
INDUSTRIES OF HOUGHTON COUNTY, MICHIGAN.

In continuation of the article that appeared in the ENGINEERING AND MINING JOURNAL in last week's issue on the copper mining district of Michigan, we now give some particulars of the industries connected with the preparation for market of the product of those mines. Concerning the four large villages with their thousands of inhabitants and well-developed institutions, the foundries and machine shops, saw mills, railroads, dock and warehouses, we will say but little; our space confines us to the copper milling, smelting and manufacturing plants.

The milling plants of the larger mines are located on Portage and Torch lakes, near the center of the developed portion of Houghton county. In the early history of the county Portage lake was the seat of most of the mills. At one time the list included the Atlantic, Franklin, Hancock, Isle Royale, Osceola, Pewabic and Quincy mining companies' plants. These were all within or near the villages of Houghton and Hancock, on a narrow neck of the lake. Of this number the Hancock, Isle Royale and Pewabic are now idle, owing to a suspension of mining operations. The Osceola and Quincy were compelled to move because of insufficient space for tailings, locally called "sand." The War Department of the United States caused a survey of the lake to be made, and, finding that certain of the companies were trespassing upon navigable waters in depositing their sands, began suit against them, and the Atlantic and Franklin mining companies are the only ones which remain unmolested. Eventually these will be compelled to move.

One of the points advocated in the government's complaint against the companies operating on this lake is that, no matter if the sand is not deposited directly in the lake, the water which drains from it carries in suspension fine particles of matter, which on settling, will eventually fill up the channel. Surveys have proved, however, that this sediment is so insignificant that it is hardly worth mentioning.

Torch lake, in recent years, has grown to be the center of the mill plants. Along its west shore for a distance of five miles there is almost a continuous line of buildings, many of which are directly connected with



PLANT OF THE TAMARACK-OSCEOLA COPPER MANUFACTURING COMPANY, MICHIGAN.

the milling industry. The plants consists of the Calumet & Hecla, Osceola, Tamarack and Quincy.

The Calumet & Hecla was the first to establish its plant on these shores. It is one of the most extensive and magnificently equipped in the country. The mills are two in number, the "Calumet" to the north and the "Hecla" to the south. The former contains eleven heads and the latter seven. They are of the Leavitt pattern. The force of the blow is between eighty and ninety tons. The mortar weighs ten tons, anvil fifteen tons, shaft 3,500 pounds and piston 1,500 pounds. The shoe, which is of a secret composition manufactured by C. J. Hodge and I. E. Cleaves & Son, of Hancock, weighs about 675 pounds. It lasts from five to six days. The rock is stamped to a fineness of three-sixteenths inch screen. The stamp is fed with water through a three-inch pipe, running under a pressure of fifteen pounds. There are in the mills 612 jigs and 72 slime tables, and four separators to each head. A number of the heads are always held in reserve. About 3,000 tons of rock are treated daily; this is brought down over company's railroad from the mine, a distance of six miles. It will be remembered that the copper is native (in metallic form) and all the treatment necessary is concentration.

The plant used has been altered from time to time to maet the requirements of the material handled, and one special feature is the Evans slime table. This was invented by J. V. W. Rawlins and improved upon by the gentleman whose name it bears. The mineral is dressed to about 65 per cent. purity, instead of 76 per cent. as formerly. The loss of mineral is very slight. At the present time all the companies, except the one under consideration, barrel thier copper for transportation to the smelters. The Calumet & Hecla, owing to its immense output, adopted a system of metal cars, the body of the car consisting of a solid piece of cast iron, round at the bottom and hung on pivots at either end. It is run into the mill, loaded with mineral and hauled to the smelting works over a four-foot gauge track.

All the machinery is run from the main engine house by means of wire rope transmission. Two pumps, the "Ontario" and the "Huron," supply the immense amount of water consumed by the mill. A new pumping engine, known as the "Michigan," is being erected at the plant. A sand wheel, 54 feet in diameter, has also recently been constructed. On its rim are 432 teeth, 4·71 inch pitch and 18 inch face. It is driven by a pinion having 33 teeth and a speed of 600 revolutions a minute. The shaft is 30 inches in diameter, the journals being 22 inches in diameter, 3 feet 4 inches long. The steel buckets, 448 in number, are 4 feet 5½ inches long and 21 inches deep. The capacity is 3,000,000 gallons of

water and 2,000 tons of sand every 24 hours. There are two other sand wheels in the equipment which are of a smaller size, each being about 40 feet in diameter.

The superintendent of the plant is F. G. Coggin, the author of a series of papers entitled "Notes of the Steam Stamp," which appeared in Vol. XLI (1886) of the ENGINEERING AND MINING JOURNAL, pages 210, 232, 248.

The milling plant of the Tamarack Mining Company is among the newest, best equipped and managed in the district. It consists of four head of Ball stamps and a foundation for a fifth. The mill is equipped with water supply capable of meeting the needs of six heads of stamps at all seasons of the year. The rock is from the same conglomerate bed as that of the Calumet & Hecla, and its treatment is similar to that of the Calumet & Hecla mill. The Tamarack mill was the first to put in solid beds under the mortar and mortar blocks as a substitute for spring timbers. This was introduced in erecting No. 3 head, May 8th, 1888, against the popular belief that the jar would in time cause serious damage to the stamp head. The trial proved so successful that similar beds have been placed under the remaining three heads. Concerning the results attained by the stamps operating on these foundations, Superintendent Daniell publishes the following in his 1889 annual report:

"Besides dispensing with oak timbers under the mortar (doing away with a heavy expense), we note a reduction in the fuel bill, which indicates that we have not yet put out our best figures." The cost of stamping a ton of rock in 1888 was 53·06 cents, and in 1889, 47·49 cents. The cost of stamping in 1890 may be learned from another column of this issue, giving an abstract of the Tamarack Company's report just issued.

The Atlantic Mining Company's mill is the one which makes most excellent returns from the lowest grade of rock mined in the district. This carries less than three-quarters of one per cent. of copper to the ton of rock. Notwithstanding this fact the excellently equipped and operated milling plant, in conjunction with an equally well equipped and operated mine, has enabled it for years to keep its place in the front rank of dividend payers. The company owns and operates a railroad running from the mine to the mill, a distance of about six miles. The average cost of transporting a ton of rock over this road in 1889 was 3·88 cents. During the same period the cost of stamping and separating a ton of rock was 27·78 cents. The mill is equipped with five head of Ball stamps, which have a total daily capacity of 1,000 tons. The average percentage of copper per ton of rock milled, during a series of years, can be readily computed from the following table:

1882	13·86	pounds	per	ton	of rock.
1883	13·7	"	"	"	"
1884	15·1	"	"	"	"
1885	14·86	"	"	"	"
1886	14·18	"	"	"	"
1887	14·24	"	"	"	"
1888	13·24	"	"	"	"
1889	13 27	"	"	"	"
1890 (first half) about	13·27	"	"	"	"

The rock is an amygdaloid. It is harder to crush than the conglomerate, but does not wear the shore nearly as much. A stamp shoe, operating on the Atlantic rock lasts about three weeks, or three times as long as one stamping the Calumet & Hecla conglomerate. The mesh used is a 13 wire gauge. The process of treating the slimes is the same as is followed in the other mills of the district.

There is an industry in this district concerning which but little has been written. It is the plant of the Tamarack Osceola Manufacturing Company, located at Clark, as locally known, Dollar Bay (see cut), on the shores of Portage lake. Three years ago the site was heavily wooded; to-day it is a prosperous village of perhaps 2,000 inhabitants, and the seat of smelting works, copper-rolling and wire-drawing mills. The rolling mill was the first in operation. It is equipped with four sheet rolls and annealing furnaces, one cold roll and a set of rod rolls and furnaces; also, a full complement of trimming machines and a tinning department. It manufactures all lines of sheet goods and rods, and in addition the rods used in the wire mill.

The main building of the wire mill is 140 feet long on the west side, 105 feet on the south and north, with a court 40 feet wide extending 60 feet into the east side. A wing, 104 × 70 feet, has been added to the west end, and a large stone annealing house has been built on the south side. This large building is filled to overflowing with wire-drawing frames and auxiliary machines. Among the latter might be mentioned five large annealing furnaces, a 60 horse power dynamo, and several Thomson-Houston electric welding machines. The power is supplied by a 100 indicated horse power compound Wheelock engine. Wire of all sizes known to the trade is manufactured. The company is reticent in giving data concerning its operations.

The village of Clark is also the seat of the smelting works which treat the Tamarack, Osceola and Kearsarge mineral. The furnaces are three in number, larger than those in use in other plants of that district. The slags are treated in a cupola and the product carrying about the same per cent. of copper as the mineral resmelted.

The Calumet & Hecla mineral is smelted at a plant located on the shores of Torch Lake, supposed to be a branch of the Detroit and Lake Superior Smelting and Refining Company. There are fourteen reverberatory and two blister furnaces in operation.

The Detroit and Lake Superior Refining and Smelting Company's main works are located near Hancock. It is here that the mineral of the companies not previously mentioned is treated. From six to eight furnaces are in operation.

Deep Shafts.—Among the deepest colliery shafts in England are Ashton Moor Colliery, in Lancashire, which has a depth of 2,850 feet below the surface, and the celebrated Monkwearmouth pit, in Durham, with a depth of over 1,800 feet. In Bohemia there are two shafts which, measured from the surface, have a depth of 3,546 feet and 3,509 feet, respectively, but the commencement of the sinking is 1,760 feet above the sea level. In Prussian Saxony there is a boring which has been carried downward to the depth of 5,736 feet. In Belgium a shaft has been sunk below the sea level 3,084 feet.—*Mining Journal.*

THE NEW YORK MEETINGS OF THE AMERICAN INSTITUTE OF MINING ENGINEERS, THE BRITISH IRON AND STEEL INSTITUTE, AND THE VEREIN DEUTSCHER EISENHUETTENLEUTE.

In the above title we place the American society first, not from any want of proper courtesy to our guests, but simply from the fact that the meeting of the American Institute came first on Monday afternoon, September 29th, while that of the British Institute did not begin until Wednesday morning.

The great event of Monday morning was the arrival of the "Servia" with 178 members of the Iron and Steel Institute on board. Other members had arrived earlier in small groups and some arrived later, no less than seventeen steamers having been chosen by one or more of the visitors. A delegation of the local committee went down the bay at 6 o'clock in the morning and met the "Servia" at Quarantine. In a few hours, after the usual trials with delay of baggage, etc., the visitors were safely housed in the Park Avenue Hotel.

In our issue of 20th inst. we published a list of the expected guests. A revised list printed since shows practically the same names with some additions, the whole number of visitors being 513, including 65 ladies.

From the time of the arrival at the hotel up to two o'clock in the afternoon, the hour for the first session of the American society at Chickering Hall, a reception of the most informal kind was held in the halls and sitting-rooms of the hotel. There were many cordial meetings of old acquaintances, and pleasant remembrances of courtesies which had been afforded to our own members when abroad. Many of the guests had been in this country before and were well known here, and they, of course, came in for an unusual share of attention. The names of the officers of the two foreign societies who were present are as follows:

IRON AND STEEL INSTITUTE.

President Sir James Kitson, Bart; Past-President, Sir Lowthian Bell, Bart., F. R. S.; Vice-Presidents and members of Council: Sir John G. N. Alleyne, Bart, P. C. Gilchrist, Edward P. Martin, E. Windsor Richards, G. J. Snelus, F. R. S., William Whitwell, Prof. Dr. H. Wedding, and J. S. Jeans, General Secretary.

VEREIN DEUTSCHER EISENHUETTENLEUTE.

Vice-Presidents and members of the Council: H. Brauns, J. Schlink, E. Blas, R. M. Daelen, E. Krabler, H. Macco, A. Thielen; and Emil Schrödter, General Secretary.

There were 500 guests in the city, and probably 300 American engineers, but when the meeting at Chickering Hall was called to order on the 29th ult., at 2:30 P. M., half an hour after the announced time, there were only 120 persons present. As one of the morning papers described this session, it was a tame affair. Many of the foreigners were of course tired with their voyage, and it was too much to expect that they should attend a dry scientific meeting a few hours after arrival, and of the American members, a majority had come to the meeting for the purpose of meeting their friends, and not for listening to the reading of papers which they could read at their leisure. Still duty called a goodly number of the Americans to the hall. The front rows of seats were filled with the most distinguished of the foreign guests, including most of the officers of the two foreign societies.

Chickering Hall is a splendid hall for a concert. The seats are comfortable and an orator with powerful lungs might find its acoustic properties to his liking, but it is not a good hall for an engineers' meeting. It was difficult to hear even the best speakers of the society from the platform one-third of the length of the hall, and it was impossible from one side of the room to hear a single word of an ordinary debater speaking from his seat on the opposite side.

The proceedings of the session began by a reading by Mr. James F Lewis, chairman of the local committee, of the principal part of the programme of the meetings. Mr. Abram S. Hewitt, president of the American Institute of Mining Engineers, then made a brief impromptu address of welcome. The secretary read a long list of names and addresses of candidates for membership, a proceeding which might have been dispensed with by having the ballot list printed.

Mr. James C. Bayles then read a paper entitled, Explosions from Unknown Causes, which gave an account of three different explosions of mixtures of gas and air in one establishment, the subsequent investigations of which failed to discover how the mixture could have been generated, and if generated how a spark or fire could have access to it. In the paper Mr. Bayles stated that he hoped to obtain from the experience of others satisfactory explanations of the causes of the explosions which his own investigations had failed to reach. The members present did not seem to be in the humor for discussion, however, during this session, although it was discussed by individual members among themselves after adjournment, and so what might have been a contribution to our knowledge regarding explosions and means of preventing them was lost.

A paper was announced on the programme on Cast Iron Tools for Cutting Metals, by Oberlin Smith, but neither the author nor his paper appeared.

The secretary then read by title the following papers, which were printed and distributed in pamphlet form:

Magnetic Concentration at the Michigamme Iron Mine, Lake Superior, by John C. Fowle; Ore Dressing by Electricity at the Tilly Foster Mine, by F. H. McDowell; The Magnetization of Iron Ore, by Clemens Jones; The Ball and Norton Monarch Magnetic Separator, by C. M. Ball.

After some remarks by the secretary on the magnetic concentration of iron ore, which has now reached a practical and commercially successful stage, there being several magnetic concentrators now in the field, the session was adjourned, an invitation being given to those present to witness the working of a model of the Ball and Norton magnetic separator which was on the platform. For over an hour after the adjournment those in charge of the machine were kept busy explaining it. It was run by a little electric motor, taking the current of an ordinary incandescent light, and was illuminated by two such lights in front of it. The method of separation, already described and illustrated in the ENGINEERING AND MINING JOURNAL, September 6th, was distinctly seen, and the exhibition was generally considered the most interesting feature of the session.

At the evening session two papers were read, which were illustrated

by lantern views. The first was the Iron Mountain Mine, by Professor W. B. Potter. He showed a large number of views, illustrating the character of the remarkable deposit of ore at Iron Mountain, Missouri, the method of mining it and separating it into lump and fine ore, and the concentration of the latter by "hydraulicking," which consisted in directing streams of water upon a pile of the ore, rolling it over by the force of the stream, and thus washing out the light matter and leaving the heavy. The concentration is also effected by jigging. The second paper was by Mr. W. F. Durfee on American and Foreign Practice with the Diamond Drill. The lantern views were chiefly of woodcuts and other illustrations of various American and foreign diamond drilling machines. The evening session was no better attended than that of the afternoon, and so little interest was shown in the last paper that nearly half of those present left the hall before it was finished.

On Tuesday morning the session opened at Chickering Hall with less than 80 members present, and this number was but slightly increased before adjournment. The vice-president, Mr. Eckley B. Coxe, occupied the chair.

The secretary, Dr. R. W. Raymond, stated that on account of the absence of Herr J. Pohlig, of Cologne, Germany, who was to have read a paper on Wire Rope Tramways, and of Herr L. Blas, of Essen, Germany, who was expected to read a paper on Water Gas in Europe, these papers would be passed.

Mr. H. C. Spaulding, of Boston, then read a paper on Electric Power Transmission in Mining Operations. This paper is well illustrated, and describes electric drills and cutting machinery, including an electric drill on the solenoid principle, which gives a reciprocating motion directly without the intervention of a rotary motion; also an electric cutting machine, which makes a cut 3 feet wide, 5 feet deep and 4 inches thick in 2½ minutes; the extreme height of the machine being only 23½ inches. Electric locomotives, hoists, pumps and generators are also described. Some discussion followed the paper, which tended to show that electricity is making rapid strides in becoming a most useful agent in all kinds of mining operations. At its close Dr. Raymond announced that at the close of the Western trip the Thomson-Houston Electric Company, of Boston, would organize an electric excursion to Boston and elsewhere for the information of the members and their foreign guests.

A paper by Mr. H. H. Campbell, of Steelton, Pa., on Physical and Chemical Equations of the Open Hearth Process, was expected at this session, but on account of the absence of the author it was read by title only. This is undoubtedly the most elaborate study of the reactions of the open heath process which has ever been made, and includes the chemical and thermal equations of the process, both acid and basic, based upon a great number of analyses and other data. The conclusion of the thermal equation shows that 94 per cent. of the heat generated by the combustion of the coal used in the process is required merely to keep the furnace at a working temperature, supplying the losses in the producer and flues, in ash, and in radiation; the other 6 per cent., together with 5½ per cent. derived from internal combustion, being all that is lost in heating and melting the bath. The consumption of coal in keeping a furnace at a dull yellow temperature is over three-quarters as much as is necessary in melting operations.

The following papers were also read by title at this session: Amalgamation at the Comstock Lode, Nevada, a Historical Sketch of Milling Operations at Washoe, and an Account of the Treatment of Tailings at the Lyon Mill, Dayton, by A. Hodges, Jr., Boston. Notes on the Excavation of the New York Aqueduct, by J. P. Carson, New York.

During the session Dr. Raymond announced that all the papers, together with an account of all the excursions, entertainments, etc., would be published in a special volume, to be given as a souvenir of the joint meetings to all the foreign visitors.

The afternoon session was called to order at 2:30 P. M., the attendance being no larger than in the morning. Dr. Raymond announced that there would be no regular meeting of the Institute in February next, and that the necessary official business, such as the scrutinizing of ballots, would be attended to by a committee appointed for the purpose.

Mr. Robert W. Hunt was called upon for his paper on American Rolling Mills, but he excused himself, as he had not been able to get it ready in time for the meeting.

Mr. S. T. Wellman then read a paper on Machinery for the Charging of Heating and Melting Furnaces, which covered practically the same ground as the article by Mr. H. M. Howe, which we published in the Engineering and Mining Journal of August 23d, 1890. This paper shows a most important advance in labor-saving appliances in furnace-charging. It was discussed by Dr. H. Wedding, of Germany, and by Messrs. Howe and Wilcox.

A highly interesting paper was read by Herr R. M. Daelen, of Düsseldorf, Germany, on Recent Improvements in German Steel Works. This paper shows that the recent German works are in the very front rank in rolling mill practice, and their equipment compares favorably with that of the most modern English and American mills. The use of the plain soaking pit, without gas firing, in Germany has met with complete success. The most vigorous discussion of the meeting followed the reading of this paper, which was participated in by Messrs. Wellman, Hunt, Howe, Durfee and others. It was shown by some of the speakers that the use of the plain Gjers pit had been tried and condemned as a failure in several American works. Mr. Durfee explained the cause of the failure, and predicted that it would yet be proved a great success, and would eventually be introduced in every fully equipped Bessemer works. He stated that after thorough experiments with the plain pits at Steelton the Pennsylvania Steel Company had determined upon their adoption on a large scale at its new works at Sparrows Point, Md.

The following papers were read by title:

Pneumatic Hoisting, by H. A. Wheeler, St. Louis, Mo.

The Walker Anti-Vibration Regulating Shutter or Slide for Guibal or other Inclosed Fans, by Edward R. Walker, Weybridge, England.

The Department of Metallurgy and Economic Geology in the National Museum, by F. P. Dewey, Washington, D. C.

Notes on Coal Mining in Oregon, by R. H. Norton, Portland, Ore.

The Resources of the Black Hills and Big Horn Country, Wyoming, by H. M. Chance, Philadelphia, Pa.

The Potosi, Bolivia, Silver District, by Arthur F. Wendt, New York City.

The Pratt Mines of the Tennessee Coal, Iron and Railroad Company, by Erskine Ramsay, Pratt Mines, Ala.

The Paint Mines of Lehigh Gap, Pennsylvania, by C. E. Hesse, Bethlehem, Pa.

Methods and Apparatus for Boring and Operating Oil Wells, by J. C. Boyce, Pittsburg, Pa.

Commercial Analyses of Lake Superior Iron Ores, by George W. Goetz, Milwaukee, Wis.

The evening session was by far the best attended one of the meeting of the American Society, the hall being comfortably filled. The attraction was three papers, which were illustrated by lantern views, the interest of which was sufficient to hold the audience for two hours. The first was by Mr. A. Fteley, of New York on the New York Aqueduct. The methods adopted in this great engineering work were fully described in a most agreeable manner, and the numerous views were given from photographs taken during the building of the aqueduct.

The next paper, or rather lecture, was by Mr. James Douglas, Jr., of New York, on the Copper Resources of the United States. The subject was treated historically, beginning with the early copper mining before the working of the great Lake Superior deposits. These were then vividly described, together with the methods of mining adopted, bringing the subject down to the latest practice at the Calumet & Hecla and the Tamarack mines of Michigan. The deposits and mining and metallurgical methods of Arizona and Montana were then illustrated. Some statistics were given, showing that the per capita consumption of copper in the United States was, in 1860, 0·5 pound; in 1870, 0·4 pound; in 1880, 0·7 pound, and in 1890, 2·7 pounds. Forecasting the future, and looking to a tremendous increase in the copper consumption, the speaker said that while the great deposits now mined were destined to exhaustion at a somewhat remote date, and there was no great probability of the discovery of any other deposits of equal magnitude of rich ores, still the now unworked deposits of low-grade ores, which in future, with improvements in metallurgical methods, in cheaper transportation of fuel, or the opening of new coal mines, would be cheaply smelted, were practically inexhaustible, and that in the next century the demand for copper would be fully supplied.

The last paper was by Mr. Eckley B. Coxe, on the New Iron Breaker at Drifton, Pa., with Remarks on the Preparation of Anthracite Coal. The speaker described the usual form of breaker, and showed that one great defect of it was its highly combustible nature, and illustrated the new breaker, which is built wholly of iron and glass. Views of the breaker in every stage of its construction were shown upon the screen, together with illustrations of the breaking, screening and sizing machinery.

The following papers were read by title:

The Ensley Blast Furnaces, by J. S. Kennedy, Ensley, Ala.

A Study of the Economics Effected by Modern Improvements in Mining, by R. P. Rothwell, New York City.

Coal Mining and Coke Making in Tennessee, by J. J. Ormsby, Tracy City, Tenn.

The Gogebic Range, by J. Parke Channing, Ishpeming, Mich.

Latest Developments in Compressed-Air Motors for Tramways, by D. S. Jacobus, Hoboken, N. J.

The two evening sessions of the Institute with the lantern illustrations were all that redeemed this meeting from being one of the least interesting, as far as its sessions were concerned, that has been held in several years. Many of the papers were of exceptional value, but very few of them were read, and on not one of them had any discussion been prepared beforehand. Although the number of members registered at the headquarters was large, but a small fraction of them attended the sessions.

British Iron and Steel Institute.

On Wednesday morning the sessions of the Iron and Steel Institute began, and they were a most agreeable contrast to those of the American Society. The first session was called to order before 10 o'clock, Sir James Kitson being in the chair, surrounded on the platform by nearly all the officers of the Institute and of the German Society. Prominent among them were Sir Lowthian Bell and Messrs. E. P. Martin, Windsor Richards, Percy Gilchrist, W. Whitwell, Jeremiah Head, J. S. Jeans, the secretary, Dr. H. Wedding and Herr E. Schroedter. The hall was practically filled, over 300 persons being present. Certainly no such gathering of metallurgists had ever before been seen on this side of the ocean. The burst of applause which greeted Sir James Kitson when he called the meeting to order was but an earnest of the enthusiasm which prevailed throughout the session.

The proceedings began with an address of welcome by Mr. Andrew Carnegie. In his happiest vein he referred to the fact that while America had done wonders in developing metallurgical practice, still the inventions upon which our success depends were British. He spoke of the work of Cort, Neilson, Bessemer, Siemens, Thomas, and other British inventors and paid a high tribute to their labors. He told our guests that our whole continent was open to their inspection, and that as we had benefited from what England had done for us and for the world, so he hoped that they would take back information from America that would be of material benefit to them.

During Mr. Carnegie's address General Sherman entered the room, and on his being invited to the platform received an ovation.

Sir James Kitson made a most happy acknowledgment of the address of welcome, and then read a carefully prepared address.

After the address of the President, Mr. James F. Lewis, chairman of the New York local committee, made some announcements, and he was followed by Mr. William P. Shinn, chairman of the Committee on Transportation, who gave an elaborate outline of the proposed excursion to the West. He stated that three special trains, with sleepers and dining cars, would be provided, and explained the absolute necessity of everything being done on schedule time. The laws of the Medes and Persians, he said, were laws of great elasticity compared with those of the transportation committee. Mr. D'Invilliers made an announcement on behalf of the Philadelphia committee.

The Deputy Minister of Agriculture of Canada was then introduced, and he read a long and urgent invitation to the guests to extend their trip to Canada, promising that special trains would be provided by the government.

It was explained that the address which had been expected from Hon. . . .

A. S. Hewitt, president of the American Institute of Mining Engineers, was unavoidably postponed on account of that gentleman's illness.

The secretary, Mr. J. S. Jeans, then read the minutes of the last meeting of the Institute in London, which were approved by the members and formally signed by the president.

The president then announced that Sir Frederick Abel had been nominated to succeed to the presidency for the next two years, and called on those favoring his election to hold up both hands. This was done with applause.

The business of the session was then proceeded with by the reading of a paper by Mr. James Gayley, of Braddock, Pa., on American Blast Furnace Practice, with special reference to large yields. This paper we publish in abstract in this issue.

The advantage of having this paper printed and distributed in advance of the meeting was at once seen in the discussion which followed. It was opened by Sir Lowthian Bell, who read a carefully prepared paper, in which he took Mr. Gayley's figures and compared them with figures from an English furnace working in Cleveland hematite. He began by saying that Mr. Gayley's paper contained "most astounding information," but ended by showing from his formula and calculations that such results were not beyond what might be expected under the conditions. The following are some of his chief figures:

	Cleveland furnace.	Pittsburg furnace.
Cubic contents, c. ft.	15,500	19,800
Temperature of blast	704°C.	593°C.
Coke per ton of iron, cwt.	19·99	16·80
Limestone per ton of iron, cwt.	11·	10·71
Ore per ton of iron, cwt.	48·	32·23
Weight of blast per ton of iron, cwt	87·15	71·20
Weight of gases per ton of iron, cwt	119·47	100·10
Temperature of waste gases	250°C.	160°C.
Tons of iron per 1,000 c. ft. of space, per week	22	117
Slag per ton of iron	28	10·71
Calories required per ton of iron	88,577	69,244
Cwt. coke required for fusion of slag	3·44	1·43
Cwt. coke required to heat waste gases	1·60	0·93
Approximate heat requirement to cover loss by radiation, convection, tuyere water, etc., calories	9,740	8,987

Sir Lowthian Bell concluded by stating that it was probable that both the Pittsburg furnace and the Cleveland furnace were working under the best conditions for the ore and fuel, and that if the rate of driving of the Pittsburg furnace were either increased or diminished, the results would not be as good, while with the Cleveland furnace no better results would be obtained by more rapid driving.

Mr. Edgar S. Cook, of Pottstown, Pa., continued the discussion by comparing Mr. Gayley's practice with coke with the practice of the Warwick furnace with anthracite and one-quarter coke, and showed that the remarkable yield of the Pittsburg furnace relative to its cubical capacity, viz., 59 cubic feet for one ton of iron per day, had been exceeded by Warwick furnace, which had required only 56 cubic feet. The hour for adjournment having arrived, further discussion was postponed to Thursday's session.

In the afternoon an excursion of the joint societies was held. The fine twin screw, triple expansion harbor steamer "Sandy Hook" had been engaged, and it left Twenty-second street at one o'clock, going up the river almost to West Point, and returning at seven o'clock. An excellent lunch had been provided, the steward of the Engineers' Club being the caterer, and everything that possibly could have been done was done for the entertainment of the guests. Cappa's Seventh Regiment band played the national airs of Germany, France, England and America, besides classical music. The weather was simply perfect, only enough clouds being in the west to secure a magnificent sunset. The scenery of the glorious Hudson was almost at its best, lacking only the tints of the foliage which will characterize it two weeks later. The weather was just warm enough, and the sun not too strong, to make the upper promenade deck the most pleasant part of the boat on which to enjoy the scenery and to circulate around and become acquainted. The encomiums lavished by the guests, such as the German's statement that "It surpasses the Rhine" and the Englishman's that "We have nothing like it in England; it is like Switzerland," were enough to satisfy the most sensitive Yankee that his efforts to make the trip enjoyable had been entirely successful, and were appreciated by his guests beyond his fondest hopes. It was a thoroughly happy and most memorable trip, and did more than anything else could have done to put guests and hosts on the best possible footing with each other, and to prepare them for the great excursion yet to come.

On Thursday morning the first business of the session was the continuation of the discussion of Mr. Gayley's paper. Messrs. A. Theilen, of Germany, Windsor Richards, G. J. Snelus, Wm. Whitwell, E. P. Martin, and Sir Lowthian Bell, of the British engineers, and E. C. Potter, Julian Kennedy, Wm. Kent and Jos. D. Weeks, of the Americans, took part in it. The discussion was closed by Mr. Gayley, who was accorded a vote of thanks for his paper, in the usual English fashion.

The chair then announced that Mr. A. S. Hewitt had sufficiently recovered from his illness to be able to be present at the meeting, and that the ceremony of presenting him with the Bessemer gold medal, which had been awarded to him by the council of the Institute, would now take place. Mr. Hewitt then appeared upon the platform and was greeted with hearty applause. Sir James Kitson made the address of presentation, reciting Mr. Hewitt's eminent services in the advancement of metallurgical science and art, and stating that in 1856, the same year in which Mr. Bessemer read his first paper on the new process for making steel without other fuel than that contained in the pig iron, Mr. Hewitt built and tried an experimental vessel in America. He was also the first to adopt the Siemens-Martin process in America.

Mr. Hewitt, in reply, then read a carefully prepared address, in which he recounted the enormous influence upon the world's social economy which the invention of Bessemer had exerted. That invention, he said, has enabled the United States Government to pay its national debt, and has cheapened the cost of food to all Europe and America. He concluded by asking the president to carry back to Sir Henry Bessemer "the grateful regards of his kin beyond the sea, whose homes he has multiplied, whose country he has developed, whose burdens of debt he has lightened, and whose progress in all the arts of civilization he has placed upon a basis as durable as the material with which his name will ever be associated."

After Mr. Hewitt's address, Mr Howe's paper, Notes on the Bessemer Process, was read in abstract by its author, the complete paper being in the hands of the members. It was discussed at some length by Messrs. Percy, Gilchrist and Tozer of the English members, and by Mr. W. F. Durfee, of Pennsylvania, who was in charge of the first Bessemer works in America, the experimental plant at Wyandotte in 1864. Mr. Tozer made the statement that if the English works were driven with the same rapidity as the American it would require only five of their fifteen rail mills to supply the demand in Great Britain, and that the other ten would have to be idle.

A large audience was present at the afternoon session, the sole proceedings of which was the reading by Mr. James Dredge, the editor of London *Engineering*, of his memorial address on the life of Alexander Lyman Holley. Mr. Dredge was the first acquaintance Mr. Holley made on his first visit to England in 1856, and he was the last to bid him final good-bye on his return from England twenty-five years later, shortly before his untimely death. The address was a magnificent tribute to Mr. Holley's services and character, and was listened to with breathless attention by the audience. He told for the first time the true story of the famous telegram which was sent to the ENGINEERING AND MINING JOURNAL at the time of the Lake Superior meeting of the American Institute of Mining Engineers in 1880, when Mr. Holley was on what was then feared to be his death-bed. A consultation of physicians was held, and they gave as their opinion that his death was a question of only a few hours. Mr. Holley called Mr. Dredge to his side and said, I want you to telegraph to America. "What shall I say"? asked Mr. Dredge. "Say that the doctors have observed a marked improvement," replied he. The telegram was sent to the ENGINEERING AND MINING JOURNAL, and from that hour Mr. Holley began to recover, and he lived to return to America and to make another trip to England. At the close of the session the members marched to Washington Square, where the Holley memorial, a splendid bronze bust, by J. Q. A. Ward, on a stone pedestal, was unveiled, Mr. J. C. Bayles presenting the bust to the city, and Mr. Gallup, of the Park Commissioners making the address receiving it.

At the session in Chickering Hall, a splendid portait of Mr. Holley, the gift of his widow to the American Society of Mechanical Engineers, was exhibited on the platform.

In the evening the Iron and Steel Institute held its regular annual banquet at Delmonico's, which was attended by many distinguished engineers and was a great success.

Early on Friday morning a number of the visitors were escorted by Mr S. S. Wheeler, expert, to the Board of Electrical Control, to the Edison electric light works on Thirty-sixth street, the Brush electric light works on Elizabeth street, the Western Union Telegraph building on Broadway, and the telephone building on Cortlandt street. In consequence of this trip the attendance at the morning session at Chickering Hall was rather small.

The first paper presented at the session was on Aluminum Steel, by Mr. R. A. Hatfield, of Sheffield, England, the son of the inventor of manganese steel. The paper was discussed by Messrs. J. E. Stead, P. C. Gilchrist, and E. P. Martin.

Mr. Elihu Thomson, of Boston, then presented a paper on Electric Welding, illustrating it by exhibiting welding machines in actual operation on the platform, and by lantern views of other machines. The paper was discussed by Messrs. Ewing Matheson, P. C. Gilchrist, and Sir James Kitson.

In the afternoon a number of excursions were on the programme for the members to choose from. The principal ones were by boat on the East River to the Navy Yard, the new bridge over the Harlem, and the works of the De La Vergne Refrigerating Machine Company; by train to the Tilly Foster mine, and by another train to Mr. Edison's laboratroy at Llewllyn, N. J. The latter excursion attracted the largest number of guests, nearly 400 persons. A luncheon was served at the laboratory, after which the ladies were taken in carriages through Llewellyn Park and to Eagle Rock, the view from which was, unfortunately, obscured by the rain. In the evening the visitors are left free to entertain themselves, and on Saturday morning they left in three special trains for Philadelphia, where they will be taken in charge by the local committee of that city.

DIVIDENDS PAID BY MINING COMPANIES DURING SEPTEMBER AND SINCE JANUARY 1ST, 1890.

Name of Company.	Paid in Sept.	Paid since Jan. 1st.	Name of Company.	Paid in Sept.	Paid since Jan. 1st.
Alice, Mont	$25,000	$75,000	Helena & Frisco, Mont.		$70,000
Amador, Cal		31,250	Homestake, Dak	$12,500	112,500
Atlantic, Mich		100,000	Horn Silver, Utah		100,000
Aspen, Colo	20,000	140,000	Idaho, Colo		49,000
Badger, Ontario		37,500	Iron Mountain, Mont.		25,000
Bangkok - Cora Belle, Colo		6,000	Jay Gould Kearsarge, Mich		22,000 100,000
Bimetallic, Mont	50,000	150,000	Little Chief, Colo		10,000
Boston & Mont., Mont		550,000	Little Rule, Colo	10,000	70,600
Caledonia, Dak	8,000	48,000	Mammoth, Utah	40,000	360,000
Calliope, Colo	5,000	70,000	Matchless, Colo		2,500
Calumet & Hecla, Mich.	500,000	1,500,000	May Mazeppa, Colo	10,000	40,000
Candelaria Con., Mex		60,000	Metropolitan, Mich		250,000
Centennial-Eureka, Utah		45,000	Montana Ltd., Mont Napa, Cal		141,022 40,000
Central, Mich		20,000	New Guston, Colo		50,000
Champion, Cal		20,000	Ontario, Utah	75,000	675,000
Cœur d'Alene, Mich		60,000	Oro, Colo		95,000
Cortez, Nev		60,000	Osceola, Mich	50,000	150,000
Cons. Cal. & Va., Nev		162,000	Parrot, Mont		72,000
Cumberland, Mont		15,600	Poorman, Colo		2,000
Daly, Utah		337,500	Puzzler, Cal		5,000
Derbec Blue Gravel, Cal		20,000	Quicksilver Pref., Cal		125,109
Don Enrique, Mex		3,000	Quincy, Mich		320,000
Elkhorn, Mont		50,000	Reed & National, Colo	5,000	25,000
Eureka Con	12,500	25,500	Republic, Mich		100,000
Franklin, Mich		80,000	Silver Mg. of L. V., N. M	25,000	175,000
Granite Mountain, Mont	200,000	2,000,000	Tamarack, Mich		360,000
Hecla Cons., Mont		30,000	United Verde, Ariz		30,000

PERSONAL.

Mr. F. W. Malcolm has been appointed superintendent of the Kentucky Coal, Iron and Development Company, of Pineville, Ky.

Mr. Joseph Bresling has retired from the Bresling Manufacturing Company, Cincinnati, Ohio. Messrs. Enneking and Trautman, the remaining members of the company, will continue the business.

Mr. R. A. F. Penrose, Jr., Assistant State Geologist, Geological Survey of Arkansas, has been in the city during the week. He has gone to Philadelphia, and will remain there until December, when he will return to Arkansas.

The State School of Mines at Golden, Colo., opened the school year on the 24th ult. At the time 53 students had registered. The faculty has discarded all special courses. Prof. Louis E. Hill has been added to the faculty. He has the chair of physics and electrical engineering.

Mr. Thomas H. Phillips, on the 1st instant, assumed the position of general superintendent of the Lehigh & Wilkesbarre Coal Company, with supervisory charge of the company's business in the Wyoming and Lehigh regions. Mr. Elmer H. Lawall has been appointed superintendent of the Wyoming division.

H. M. Holden, president of the Kansas City Mining Exchange and F. N. Chick, of the Kansas City National Bank, visited Joplin, Mo., last week looking after their mining interest. These gentlemen called at the ENGINEERING AND MINING JOURNAL office and expressed themselves as well satisfied with their recent investments in the lead and zinc mines of the Joplin district.

OBITUARY.

John D. Negus died at his home, Brooklyn, the 21st ult., of the effects of nervous prostration, aged fifty-eight years. He was the inventor of the break-circuit chrometer, the delicate instrument used in astronomical observations.

ITEMS FOR EXPORTERS.

Here is an announcement that should interest manufacturers and shippers of agricultural machinery and other American products. The Governor of Rio Janeiro and the representatives of the Agricultural Company (the Alto Parahyba) have just signed a contract by which the latter secures a large amount of agricultural land. It is intended to invite a large number of immigrants and to apportion the land into small agricultural holdings. The capital of the company is $3,000,000. No doubt the representatives of English and German houses are already on the alert to push their wares.

The following articles have been placed on the Canadian free list of imports: rolled iron tubes, not welded, under 1½ inch in diameter; angle iron, 9 and 10 gauge, not over 1¼ inch wide; iron tubing, lacquered or brass colored, not over 1¼ inch diameter, all of which are to be cut to lengths for the manufacture of bedsteads, and to be used for no other purpose. When imported for the manufacture of iron bedsteads, to be used for these purposes only in their own factories until such time as any of these articles are manufactured in Canada.

We learn that another new steamer for the Brazilian trade has been launched at Roach's yard, Chester, Pa., and named the "Vigilancia." She is 336 feet long, 45 beam, 27 deep, 4,033 tons, and will cost about $500,000 when completed.

Some months since the New York Steamship Company was formed, its directorate being composed of several wealthy and well-known New York and Brooklyn gentlemen. It has started the first direct steamship line to Newfoundland, and so large has been its business with its first steamship that another is to be added next spring.

We learn that Messrs. Park Bros. & Co., manufacturers of merchant steel, New York and Pittsburg, have decided to establish agencies in England for the sale of their products. They believe that they can compete successfully with the English.

Mr. G. Follansbee, of the Pittsburg Chamber of Commerce, has prepared a paper showing what is the extent of the export trade of Pittsburg. From it we quote, as abridged in the Pittsburg *Times*: The chief articles of export are glassware, springs and axles, plows, gaspipe, wire fence and wiring, leather, tallow, steamboats, locomotives, ore-crushers, air brakes, patent medicines, etc. The principal exports direct from Pittsburg are lamps, bottles, vials, and tableware, which go to Brazil, Great Britain, Mexico, Central American States, China, Japan, Cuba, and Porta Rico. The value of glassware exported when the report was made equaled $215,000. It has since grown to a much larger estimate. Glass molds for manufacturing pressed and ground glassware are being sent in large numbers to Great Britain and Germany, and a greater part of the exports are considered as indirect, and Pittsburg gets no credit for them. Many of the larger manufacturers have branch offices or agents in the eastern seaport cities, and the exports principally go through these channels. Thus the export business of Pittsburg helps to swell that of Eastern cities without honor being attained by this place. As to refined petroleum, nearly 1,000,000 barrels were sent out last year, but not a single barrel was regarded direct from Pittsburg. Mr. Follansbee said: "Pittsburg would figure on a much higher rank in the list of cities doing exportation business were it not that manufacturers find it much cheaper to establish branch offices in seaport towns. But as it is, the business here is increasing right along, and the next report will show surprising figures."

The political atmosphere of Hawaii is disturbed. The more intelligent of the natives have lately been protesting loudly against what is virtually a government by Americans, and the cry "Hawaii for the Hawaiians" is now hourly heard and daily read. The United States ship Charleston is held in readiness to protect the interest of Americans in the event of the generally expected uprising. Shippers to the Sandwich Islands will do well to advise themselves of these facts.

A contemporary says, very appropriately: Illustrating the carelessness of shippers of American goods to South America, the representative of an American firm, in an interview published in a San Francisco paper, says that he found, in one of the big warehouses of Valparaiso, Chili, 5,000 yokes for oxen that had already been there two years. People prefer the straight beam fastened by means of thongs to the horns of the oxen, and the new fangled yokes with their ash bows would either have to be sold at a sacrifice or converted into firewood; it would never pay to send them back to the shipper.

There is excellent opportunity just now for American competition with European makers of locomotives and other railroad material in Mexico. Her railroad system is being very generally extended, terminal facilities are being improved and enlarged. It is promised that the Mexican National Railway will shortly run a freight train between Galveston, Tex., and Mexico, which will be an accommodation and saving of time to shippers.

The extensive electro-plate works of Messrs. Babcock & Co., 71 John street, New York, was recently destroyed by fire. The firm has now leased Nos. 125 and 127 West street, where they have two much larger show rooms and better facilities than before for supplying the export trade. The machinery destroyed by the fire was valued at over $20,000.

English parties from Brazil were in Lowell, Mass., recently ordering machinery for a new cotton mill in that country to be established at Cuxias. This is the third order that has been placed in New England for cotton machinery to go to South America within a short time.—*Australasian and South American.*

The Thomson-Houston Company is completing an exhibition railway track in Sydney, N. S. W. Another line built by the Sprague Electric Company (now incorporated with the Edison General Electric Company) will be completed shortly afterward. These two experiments are expected to promote electric railways in Australia.

A recent writer to one of the New York dailies says on the subject of electric lights in Bermuda: "The next step will undoubtedly be electric lighting. There are no electric lights on the islands, and Bermuda is the place of all places where they would shine gloriously. There is a demand for them now, and the demand will soon be supplied. The corporation of Hamilton is enterprising enough to light the streets and the park with them."

A buyer from Buenos Ayres has just expended about a million dollars in miscellaneous merchandise in Chicago. He intends to try and undersell the English firms in his country.

A London company has been formed with a capital of $1,000,000 to equip and run railways, tramways, telegraphs, telephones, etc., in Nicaragua and "States or countries adjoining."

INDUSTRIAL NOTES.

It is reported that the Georgia Southern and Florida Railroad Company will establish machine shops and a roundhouse at Macon, Ga.

Several English engineers and two Chinese officials have gone to St. Petersburg to arrange for the construction of a railroad connecting the Chinese and Russian frontiers.

At Chattanooga, Tenn., the Fidelity Coal and Iron Company has been incorporated by Messrs. Morris Schwerin, M. W. Platzek, Robert Prichard, B. S. Thomas and C. W. Brown.

The Beaver Tube Company has been incorporated at Wheeling, W. Va., and will begin the erection of its plant shortly. It is stated that the capital stock of this company is $1,000,000.

Rohan Bros.' Boiler Manufacturing Company, St. Louis, Mo., filed notices of assignment for $145,000 on the 29th ult. Arrangements are said to be pending whereby it may be enabled to continue business.

Messrs. Cartwright, McCurdy & Co., proprietors of the Enterprise Iron Works, at Youngstown, O., have plans drawn up for the erection of a puddle mill to be built adjacent to their present plant. It will cost about $50,000, and will consist of a three-high muck mill and 20 puddling furnaces.

The Jeffrey Manufacturing Company, of Columbus, Ohio, manufacturers of roller and detachable chain belting, has recently filled several large orders for conveyors for foreign shipments, while its order book shows a large number of orders for shipments to different parts of this country.

The Bonzano Metallic Railroad Tie Company has been chartered in New Jersey, with a capital of $1,000,000, to manufacture steel railroad ties under the patents of M. F. Bonzano, assistant general superintendent of the Philadelphia & Reading Railroad.

Advices from Joliet, Ill., announce the sale of the Fox Steel Plate Mill, an extensive manufacturing establishment in that city, hitherto controlled by the Illinois Steel Company, to Mr. G. Fox, of England, who is now here looking after the property. The Fox Steel Plate Mill is one of the largest in the country.

Some time ago the men in the employ of the Pennsylvania Construction Company, at Uniontown, Pa., made a demand that their working hours be reduced from ten to nine, without any reduction in wages. The firm refused to grant the demand at present, but agreed to do so on April 1, 1891. The men accepted this proposition and have returned to work.

Several of the regenerative gas furnaces now being erected at the plant of the Pennsylvania Tube Works, at Pittsburg, by the S. A. Smythe & Laughlin Company, of that city, have been completed. Work is being pushed on the rest, and they will probably be completed by December 1st next. This firm, it is said, has decided to abandon the use of natural gas as a fuel.

By means of special machinery recently completed, the Cincinnati Corrugating Company, of Piqua, Ohio, is now able to corrugate sheets as heavy as No. 12, and in lengths up to 10 feet. This improvement will be appreciated by builders and engineers, and will be of special advantage in the construction of arches.

The British immigration agent at Buenos Ayres writes: "For surveyors and engineers lucrative employment offers here, as elsewhere. Architects, builders and experienced contractors with means will find competition here not as keen as in other parts. The mining resources of the country are not such as to warrant the encouragement of mining engineers or miners."

A company with $200,000 capital stock has been incorporated at Montgomery, Ala., by Charles Webster, of Philips, Wis.; W. A. Burr, of Stephens' Point, Wis., and Edward Gilbert, of Oshkosh, Wis., for the purpose of establishing car works in Montgomery. The company is now in the market for $35,000 worth of machinery, and will shortly begin work on its buildings.

The Brilliant Steel and Iron Company, of Wheeling, W. Va., has been incorporated under the laws of West Virginia for the purpose of operating the old Spaulding mill at Brilliant. The incorporators are the parties who purchased the mill at sheriff's sale recently. The company will plant for the manufacture of nails, and in addition will add a steel plate and sheet mill plant.

The pumping machinery and steam plant for the Huntington, Ind., Water Works has finally been awarded to the Boughen Engineering Company, of Cincinnati, Ohio; it is also putting in the machinery for the London Water Works, London, Ohio, and the steam plant for the Iron Mountain Water Works, Iron Mountain, Mich., besides numbers of other large steam plants, engines, etc.

At the annual meeting of the stockholders of the Troy Malleable Iron Company, held recently in Troy, N. Y., the following officers were elected: William A. Grippin, J. H. Whittemore, William Sleicher, Jr., Waldo K. Chase, Edwin Veghte, trustees: William A. Grippin, president; Waldo K. Chase, vice-president; William Sleicher, Jr., general manager; Edwin Veghte, secretary and treasurer.

The Sharon Steel Casting Company, of Sharon, Pa., is making a number of improvements. A new molding room, 100×100 feet, is being added, which will give employment to about 20 additional molders. At present they are giving employment to about 200 men. Daniel Eagan, president of the company, was in Pittsburg recently and made large purchases of machinery for the additions that are being made to the plant.

The cotton-spinning industry is celebrating the one hundredth anniversary of the establishment of cotton spinning by power in this country at Pawtucket, R. I. The exhibition was opened at Centenary Hall on the 29th inst. The building is equipped with machinery which handles the cotton from the time it is taken from the plant until it is made into finished cloth. Among the old machinery in operation is the original machine that Samuel Slater first used, and also the first cotton gin made by Elihu Whitney.

The varied uses to which steel wire can be put are illustrated by the Hartman Manufacturing Company, of Beaver Falls, Pa., in a catalogue just issued by them. Picket fences and gates, plain and ornate, from the common field fence to the most elaborate metal structure for costly residences, are illustrated in detail, as well as the

many other articles manufactured in steel which are rapidly displacing wood. The little book will well repay a perusal.

The Totten & Hogg Iron and Steel Foundry Company, of Pittsburg, Pa., who manufacture the Forster rock breaker, have published a neat illustrated pamphlet in which they treat of the subject of road making. They claim that it is now perfectly feasible to produce a roadbed of stone crushed by machinery which will in all respects be as durable as telford or macadam, which is broken by hand. It is claimed by them that their crusher so nips the stone as to produce a fracture like that made by a hand hammer.

The "Vacuum" exhaust steam economizer, manufactured by Warren Webster & Co., New York, Chicago and Philadelphia, is the subject of a little book recently published by them. "We are not claiming," they say, "any new elements for our results, but the combination of certain well-known principles, together with an improved method or process and mechanical device for utilizing exhaust steam in the most economical manner." Some fifty or so facsimile testimonials accompany the illustrated reading matter in this publication.

It is reported that the Philadelphia & Reading Railroad Company proposes to lay steel ties on a portion of its Bound Brook division in order to test their worth. There are two sizes of the tie, one weighing 140 pounds, being made of steel ⅝ of an inch thick, while a smaller size weighs 105 pounds, the steel being but ¼ of an inch thick. They are 8 feet long, 8 inches wide across the top and 3½ inches high. The hollow underneath is filled in with a ballast of broken stone and dirt. The heavy ties cost $2.25 and the light ones $1.65. They are made of Bessemer rolled steel. They are laid 2½ feet apart from center to center. They last 50 years, and when sold as scrap are worth from 85 cents to $1.10.

The Virginia Steel, Iron and Slate Co. has been incorporated at Richmond, Va., for the purpose of mining and manufacturing any of the ores, minerals, metals, materials or products of Virginia, and to conduct business in one or more points in the counties of Albemarle, Nelson, Buckingham and Fluvanna. The capital stock is to be not less than $100,000 nor more than $2,000,000, and real estate may be held not exceeding 100,000 acres. The main office will be in Richmond, Va. The following are the officers elected for the first year: President, F. T. Anderson; vice-president, H. W. Flournoy; secretary, J. G. Hankins; treasurer, J. E. Gaines; directors, Messrs. Anderson, Flournoy, J. J. Hichok, Alexander Cameron and S. Blanchard, of Richmond, and T. P. Williams, of King's Mountain, N. C.

CONTRACTING NOTES.

The Embreeville Iron Company, of Embreeville Tenn., is said to have awarded a contract for the construction of its blast furnace to the Pittsburg Engineering Company, of Pittsburg, Pa.

The Ætna Machine Company, Warren, O., have closed a contract with the Oliver Iron and Steel Company, Pittsburg, Pa., for an engine to drive the machinery in the new plant they are now building in that city.

Messrs. Riter & Conley, of Pittsburg, Pa., has recently signed a contract with the Cumberland Gas and Iron Company, of Cumberland, Tenn., for the construction of a charcoal iron furnace, 13½ × 60 feet.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

1,083. Prices on about 5,000 lineal feet of 4-inch curbing, both on 14 and 16 inches wide, in lengths not less than 4 feet. Florida.

1,084. Illustrated catalogues and price lists of manufacturers of charcoal retorts whereby a by-product is made, such as alcohol and acetate of lime. Louisiana.

1,085. Rails, cars and all other necessary equipment for a street railway three miles long. South Carolina.

1,086. Names of firms that are manufacturing vitrified paving bricks somewhere near a stream or sea coast from where they could be shipped to Florida. Florida.

1,087. A full line of machinery for manufacturing wagons and buggies. Alabama.

1,088. Iron roofing and siding for planing mill. Tennessee.

1,089. A first class modern engine from 350 to 400 H. P. Ohio.

1,090. A lath machine, bolter, and cut-off saw. Tennessee.

1,091. Machinery for separating sand from kaolin, other than by water process. Georgia.

1,092. Three or four miles of 25 or 30-pound teel rails in good shape for relaying. Arkansas.

1096. A portable 25 H. P. engine and 35 H. P. boiler. North Carolina.

1097. Dry clay brick machine. North Carolina.

1098. Two 10 and two 20-ton power traveling cranes, 48 feet 2 inches span, center to center of rails; boring mill, large lathes and other tools for boiler and machine shop. Also hot air heating arrangement for same. Virginia.

1099. A good second-hand 7 or 8-foot boring mill. Georgia.

1100. Catalogues and full particulars of steam syphons and pulsometers. Georgia.

1101. Machinery for reducing flint to an impalpable powder at the rate of 400 pounds an hour, and so separate it from the coarser material, leaving the machine impalpably fine in a body by itself. Illinois.

1102. Broom excelsior, ax handles, spoke and hub machinery. Mississippi.

1103. Woodworking machinery for planing mill and sash factory. Florida.

AMERICAN GOODS WANTED ABROAD.

1,093. Complete plant for smelting works of about 50 tons capacity per 24 hours, for silver and copper ore, to be packed in small sections, convenient for mule-back transportation. Peru.

1,094. Hickory pick handles. England.

1,095. Clothes pins, broom handles and shoe pegs. England.

1104. A prominent commission merchant of Hayti wishes to open business relations with manufacturers of cordage of all kinds (rope, cotton lines and cotton trot), wicks for all kinds of candles, spirit for night lamps, copper faucets for pipes, sail cloth for vessels, oakum for vessels, carpeting (tapissiere) or lining for lining or carpeting houses, strong mucilage packed in small bottles, rosin and carpenters' tools of all kinds. Hayti.

GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including September 24th were as follows:

			Tons. 1890.	Tons 1889.
Marquette,	Marquette District		1,050,308	1,106,851
St. Ignace,	"	"	15,911	38,254
Gladstone,	Marquette District		6,183	739,694
"	Menominee	"	50,630	14,950
Escanaba,	Marquette	"	975,868	34,184
"	Menominee	"	1,529,238	1,243,219
"	Gogebic	"	230,950	209,187
Ashland,	"	"	1,678,417	1,203,462
Two Harbors' Vermillion District			719,369	658,453
Total, tons			6,247,924	5,248,254

ALABAMA.

CALHOUN COUNTY.

(From our Special Correspondent.)

A recent dispatch from Anniston conveys the intelligence that two coke furnaces in that city will shut down in a few days on account of the dullness of the iron market. These furnaces are among the largest in the South, each turning out over 100 tons of iron per day. About 200 men will be thrown out of employment.

DE BARDELEBEN COAL AND IRON COMPANY.—This company, of Bessemer, it is stated, has recently purchased the Frog Mountain iron ore tract near Piedmont.

JEFFERSON COUNTY.

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—It is reported that a party of engineers prospecting for coal on the lands of this company struck a vein of natural gas. A test hole has been bored and gas in considerable quantity burst forth. Upon ignition it burned freely. It is thought that the find will be a valuable one.

CALIFORNIA.

(From our Special Correspondent.)

AMADOR COUNTY.

San Francisco, Sept. 27.

WILDMAN.—The last monthly clean up of the Wildman was one of the best ever made at this mine. The yield is said to have amounted over $20,000, or $1,000 to the stamp. Grading at the mill for the additional ten stamps has been finished, and the contractors have undertaken to have the mill running by the 1st of November.

CALAVERAS COUNTY.

BUCKHORN.—An extension of this mine is turning out some good ore just now. The last few shipments netted, clear of all expenses, $12 per ton.

CALAVERAS AND WOODS.—At this group of mines great activity is noticeable. The mill of the Norfolk Company is now in full swing, and a new one is in course of erection by another company.

PLACER COUNTY.

Auburn, Sept. 22.

BAKER DIVIDE.—This company has lately discontinued work on the tunnel which was intended to tap the channels between Forest Hill and Michigan Bluffs. Several hundred thousand dollars were spent in the exploration of this property, and it is a cause of deep regret that the results did not correspond to the expectation.

SHASTA COUNTY.

GLADSTONE.—This group of mines, in French Gulch district, have been sold for, it is said, $50,000. The purchasers are going to put up a 20-stamp mill and have a large force of men at work.

COLORADO.

SMALL HOPES CONSOLIDATED MINING COMPANY.—The following is from the August letter of the superintendent to Mr. R. C. McCormick, president of the company: The profits for August were $10,172.22. We held over some high grade ore which would have made the monthly profit considerable more had it been shipped. The expenses and receipts were as follows:

	Expenses.	Receipts.	Profits.
Assay office	$ 216.97	.....	.....
Gonabrod shaft	424 00	.....	.....
Kerens & Cary shaft	6,428.00	$13,305.37	$6,876.37
Kerens dump	317.39	2,415.04	2,097.65
Cary dump	336.70	1,075.03	768.63
Elkin dump	363.50	1,121.00	758.42

IDAHO.

SHOSHONE COUNTY.

PALMER FRACTION MINING COMPANY.—After a cessation of work for 18 months this company has resumed operations on the Palmer Fraction. A hoisting and sinking plant is now in operation. The main working shaft is now on the ore vein. The property is owned by Kennedy Hanley, W. A. Kinney, F. R. Moore and Charles Sweeny.

KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending September 27th the output of ore from the mining district of Galena and Empire City was: Rough ore, pounds milled, 1,646,210; zinc ore, pounds sold, 736,400; lead ore, pounds sold, 225,000. Sales aggregated a total value of $14,960.40, and the total value of the output was $17,837.

MARYLAND.

ALLEGHENY COUNTY.

(From our Special Correspondent.

CROWN & CUMBERLAND STEEL COMPANY.—It is reported that Philadelphia parties have purchased the steel plant, rolling mill, and machinery of this company, for which was paid the sum of $42,000.

MICHIGAN.

MARQUETTE COUNTY.

HUMBOLDT MINING COMPANY.—Thos. A. Edison, says the Marquette *Mining Journal*, will soon visit Marquette county in his professional capacity. For the past two years experiments have been carried on at Humboldt mine in the line of reducing magnetic banded ores, the process being designed to separate the jasper gangue from the ore. It is said, and apparently on good authority, that they have proved successful, and that a cheap and effective process of separating the ore from the gangue has been discovered, electricity playing an important part in the work. Mr. Edison goes to witness the practical operation of the work and satisfy himself regarding the value of the process. The Edison magnetic separator was illustrated in the ENGINEERING AND MINING JOURNAL, issue of December 8th. It is said that it has been considerably improved since that date.

MISSOURI.

(From our Special Correspondent.)

JASPER COUNTY.

Joplin, Sept. 29.

The almost continuous rains of last week were detrimental to mining operations. Consequently the output and sales of ore were light. Zinc ore ruled at $23.50 per ton and lead was in fair demand at $30 per thousand. Following are the sales from the different camps:

Joplin mines, 1,148,680 pounds zinc ore and 146,580 lead; value, $17,642.

Webb City mines, 721,660 pounds zinc ore and 46,400 lead; value, $8,803.47.

Carterville mines, 705,640 pounds zinc ore and 72,140 lead; value, $10,138.37.

Zincite mines, 182,780 pounds zinc ore and 1,550 lead; value, $2,280.53.

Galena, Kan., mines, 736,400 pounds zinc ore and 250,000 lead; value, $14,960.40.

All districts; total value, $53,805.53.

Mr. L. C. Dunham, general manager and a large owner of the American Nettie Gold Mine of Ouray, spent several days in Joplin, Mo., last week with his partner, A. J. Sewall, who is developing the tract of land they purchased last spring south of the Empire mines. The development during the past few months has opened up some fine bodies of lead and zinc ore.

Humphrey & Coover, of Kansas City, are opening a fine looking prospect on the Oswego land.

The electric street railway of Joplin is working a large force of men in building its new powe

house, grading and stringing the steel rails. This line will fill a long-felt want between East and West Joplin.

MONTANA.

DEER LODGE COUNTY.

CHAMPION MINING COMPANY.—A meeting of this company was held recently for the purpose of a reorganization on an assessable basis, a new company formed and the treasury stock of the old company cancelled. The capital stock represents $1,066,666 in shares of $2 each. Articles of incorporation for the new company have been filed. The trustees are composed of Deer Lodge business men, including N. J. Bielenberg, E. L. Bonner, Conrad Kohrs, H. Zenor, J. Lodge, W. Bennett and Dr. A. H. Mitchell. It is expected that work at the company's property will be resumed within a short time.

NEVADA.

(From our Special Correspondent.)

ELKO COUNTY.

According to reports all litigation between the Found Treasure and North Commonwealth mining companies of Tuscarora has been settled, and both mines are now under the same management.

STOREY COUNTY—COMSTOCK LODE.

SAN FRANCISCO, Sept. 27.

The suit instituted by M. W. Fox, of the Mining Stock Association, against the Hale & Norcross Silver Mining Company, to recover $2,250,000, continues to afford food for gossip on Pine street. The parties concerned are so prominent in the financial world and the allegations of systematic fraud are so circumstantial in character that apart from the enormous amount of money involved, far more than ordinary interest attaches to the case. The names of Senator John P. Jones, of Nevada, who is president of the Comstock Mill Company, and controls the Virginia and Gold Hill Water Company, his brother Samuel Jones, W. S. Hobart and Alvinza Hayward, are all of high rating on the Pacific coast, and yet between them in their capacity as mill owners and the directors of the Hale & Norcross Company collusion is charged for the purpose of defrauding the shareholders. Some of the directors of the company are also men of wealth, and altogether the legal fight promises to be bitterly contested.

For years murmurings of discontent have been rife regarding the poor showing made by the mines on the Comstock Lode, but it has been left for the mining association, of which Mr. Fox is a prominent member and president of the executive committee, to boldly make a charge such as is embodied in the complaint filed in the Superior Court of this State. Rather curiously an accident gave the investigators the first clew to the alleged underhand proceedings that were going on. A watchman at the Carson mint carelessly spoke of large bullion shipments being received at the mint late at night or in the small hours of the morning. For such freedom of speech he is said to have lost his place, but the fact he had divulged was communicated to those who were able to appreciate its importance, and following the clue thus given it is said a most startling state of things was uncovered. As a record of all bullion received must be on file at the Carson mint, communication was opened with Secretary of Treasury Windom who appointed Mr. Gorham of the San Francisco Mint to proceed to Carson and investigate the charges of irregularity. So little satisfied is the Mining Stock Association with the impartiality of Mr. Gorham's investigation that the good offices of Congressmen Cluin and Morrow have been sought, and Secretary Windom again has been written to with the end in view that an agent be dispatched from the East—one who cannot possibly have any bias one way or the other. So far no answer has been received to the latter request.

A common complaint leveled against Comstock companies is the omission by the management to furnish stockholders with the car sample assays, as well as the battery or pulp assays. The complaint in the present suit furnishes a reason which, if true, more than justifies the chronic discontent. It is asserted that the system has been pursued at the Hale & Norcross of drawing most sparingly on the reserves of high grade ore and mixing it with barren rock for the purpose of reducing the grade and giving the mill owners the advantage. No objection is entered against legitimate averaging of ore, but instances have been given when the grade was reduced from $400 to $18 and $20 a ton. Official assays which have fallen into the enemies' hands show rock running as high as $437 a ton, and in every case higher than was allowed to appear in the reports. After being reduced to, say, $50 a ton and shipped to the mill, the rich portions of the pulp were allowed to run into sluice boxes before reaching the amalgamating pans, and by imperfectly amalgamating the remainder there was left little or nothing for the stockholders. The slime in the sluice boxes was found on one occasion to run $109 to the ton, and as the slime tailings are worked over for the benefit of the mill owners without any accounting being made, they being regarded as perquisites, objection is made to such valuable "refuse" being appropriated by the mill owners. The further allegation that in some instances bullion had been actually removed from the retorts and shipped away in sacks purporting to contain waste material is also, according to Mr. Fox, capable of substantiation.

Since suit was commenced letters have been pouring in upon the plaintiff, some asking for fuller information, and many others volunteering statements more or less directly corroborating the charges which have been preferred.

Early in the present week a large draft of men was laid off in the Hale & Norcross mine on the plea that while there existed plenty of ore in sight, yet being low grade it would not pay to work. Rumor on the other hand has it that the small gang of men left in the mine are kept busy mining waste rock into the drifts where bodies of rich ore are located, and stopping them up for the purpose of keeping the pay rock hidden in case of any investigation.

The charges made, of which the above is the merest outline, are sufficiently serious to arouse the attention of all shareholders of Comstock companies. When the case comes up for trial it is certain that much curious information will be elicited regarding the mining and milling of Comstock ore.

HALE & NORCROSS MINING COMPANY.—M. W. Fox, Chairman of the Executive Committee of the Mining Stock Association, has sent the following letter to the Secretary of the Hale & Norcross Company:

SAN FRANCISCO, Aug, 27, 1890.

To the Board of Directors of the Hale & Norcross Silver Mining Company—GENTLEMEN: I most respectfully represent to you:

First—That I am a stockholder in the Hale & Norcross Silver Mining Company, as you will see by reference to the books of that company, and have been a stockholder at all the times mentioned herein.

Second—That I am informed and believe that the said Hale & Norcross Silver Mining Company and its stockholders have been systematically plundered for the past three years, and the property stolen amounts to more than two million ($2,000,000) dollars; that this theft has been accomplished by and through a fraudulent conspiracy and combination between the directors of the said mining company, elected and acting as such during the years mentioned, and the owners or lessees of the mills employed to mill the ores extracted from said mine.

That many devices were resorted to in furtherance of said fraudulent conspiracy and combination:

First—The very rich ores assaying from forty ($40) dollars to four hundred ($400) dollars per ton (as shown by the mine assays, but which assays were fraudulently withheld from the stockholders), were mixed with rock containing little or no mineral, for the purpose of reducing the average value of the ores, and at the same time increasing the number of tons of ore to be milled. By this means the stockholders were kept in ignorance of the high value of the best ores, and the general average, by such mixing, was brought to such a low figure as would excite no suspicion.

Second—The general average of the ores was reduced by this means to about $40 per ton as per mine assay, which value was also kept from the stockholders, but by an imperfect milling of said ores, such imperfection being fraudulently designed and intended, there was returned to the mining company about $20 per ton for all of said ores. This imperfect and fraudulent milling of ores caused a great loss to the corporation and its shareholders.

Third—The bullion thus stolen was afterward disposed of in a manner intended to conceal the theft, but it can be readily traced, for the serpents have left their slime.

It appears from the books of your company that about eighty thousand (80,000) tons of ore have been extracted from the mine since January, 1887.

That a large portion of said ores were worth so much less than the cost of extracting and milling the same as to cause a loss to the company of many thousands of dollars.

That the remainder of said ores were of great value, to wit: about three millions of dollars ($3,000,000), but not more than one million two hundred and fifty thousand dollars ($1,250,000) was returned to the mining company.

I am prepared to furnish sufficient evidence to prove the above charges, and therefore demand that you institute an action in the proper court, and in the name of the Hale & Norcross Silver Mining Company to compel a restitution of the property so stolen, and for a judgment against each and all of said conspirators for the full amount of said loss.

And I further demand that you at once cease from further co-operating with said mill owners or lessees in said fraudulent conspiracy and combination, and return to the treasury of the Hale & Norcross Silver Mining Company all the moneys and property you and each of you have received as your portion of the profits of said fraudulent scheme.

M. W. FOX.

PENNSYLVANIA.

Advice from the coal region contains the information that the car famine is seriously affecting all the railroad mines. The shortage of cars at the latter is fully 50 per cent. This not only decreases the shipments of coal to the West, but also keeps down the amount of work to be had in the mines. There is said to be little change in the coke region car famine.

COAL.

The Schuylkill Coal Exchange has issued a report dated Pottsville, September 30th, which shows that the following collieries drawn to return prices of coal sold in September, 1890, to determine the rate of wages to be paid, make returns as follows:

Beechwood Colliery (P. & R. C. & I. Company)	$2.34
Keystone Colliery	2.17 7-10
Thomaston Colliery	2.21 3-10
Draper Colliery (H. L. Williams)	2.21 5-10
Kehley Run Colliery (Thomas Coal Company)	2.27
5 (11'21 5-10	
Average	$2.24 3-10

The rate of wages to be paid for work done during the last two weeks of September, and the first two weeks of October, 1890, is nine (9) per cent. below $2.50 basis.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to September 26th, were as follows:

	1890. Gals.	1889. Gals.
From Boston	2,086,820	3,509,511
Philadelphia	117,909,432	110,108,158
Baltimore	9,176,410	5,748,611
Perth Amboy	10,773,329	13,190,791
New York	321,414,320	334,442,999
Total	461,360,311	466,800,070

SOUTH DAKOTA.

A dispatch from Rapid City, dated October 3d, says: The forest fires in all parts of the Black Hills are being got under control, but cannot be entirely extinguished until it rains. In the tin district about 60 square miles have been burned over, but on most of it only brush and dead trees were destroyed. In the northern hills comparatively little damage was done. It is impossible to estimate the loss of timber to mountain ranches and mining camps. The fires during the present season have been the most destructive in the history of the Black Hills, and though much feeling has been aroused, no arrests have been made. No one has yet been caught in fire.

TENNESSEE.

A dispatch from Chattanooga, dated the 3d inst., states that the Richland and Nelson miners at Dayton, to the number of 1,200, are on strike against a reduction in wages. No disturbance has occurred. The troubles may lead to the shutting down of the blast furnace at Dayton.

FOREIGN MINING NEWS.

ARGENTINE REPUBLIC.

It is stated that the Governor of Neuquen, Argentine Republic, has advised the Minister of the Interior of the discovery of auriferous sands in the bed of the Neuquen River, seven kilometers from Chos Malal. It is added that the tests of the sand made up to the present have given "splendid results." Coal is also said to have been discovered there of a quality superior to anything previously discovered.

CANADA.

PROVINCE OF NOVA SCOTIA.

(From our Special Correspondent.)

A discovery of asbestos is reported from a point about 30 miles south of Annapolis.

The Messrs. McCurdy, of Baddeck, Cape Breton, are opening their plaster quarries at Big Harbor. They are building a wharf and 1½ miles of railway, and have purchased a small locomotive. The plaster at this point is in immense quantity, and is reported as being of excellent quality.

The steel company of New Glasgow is completing arrangements for the purchase of several properties in the Truro township, between Maitland and Truro, containing a good quality of red hematite ore, and have secured similar ores between Maitland and Truro, close to the Basin of Minas.

GOLD.

Prof. Bailey, of the Canadian Geological Survey, has ended his summer's work in Shelburne county. He reports the area of auriferous strata much larger than was generally believed, and it is probable that discoveries of gold will soon be reported from that quarter. A trial crush of 20 tons from the Brookfield Conglomerate gave gold at the rate of 4 dwts. to the ton. Another lot of 50 tons from the same district is now being tested. The Hayward mill at Waverly has been started. It is of the most modern style, and begins with a heap of 2,500 tons of quartz on the dump.

CENTRAL AMERICA.

REPUBLIC OF COLOMBIA.

According to recently received advices, we learn that the mineral wealth of the Department of Antioquia, few and rough as are the mining facilities of that department, during 1887, 1888 and 1889 the

gold bars, coined silver, platinum, gold dust, and valuable stones exported thence were valued at $9,812,453.

CUBA.

During the month of August 5,200 tons of manganese were exported from St. Jago de Cuba. Owing to the ready sale the manganese meets with in the United States, its production is fast increasing, and it is predicted that the exports for September will be the largest known. The owners of the mines have formed a syndicate to work them themselves.

GERMANY.

Advises from abroad state that the Miners' Congress, recently held at Halle, decided to send petitions to the authorities at Berlin, the diets and the various ministers asking that mining laws be passed as follows:

That a shift shall not exceed eight hours and that overtime be abolished.

That the shifts be reduced when the men are working in wet or heated places.

That the minimum wages of pick men shall be four marks daily and that the wages of others shall be fixed in proportion.

That wages shall be paid weekly, and that a universal system of pay books be adopted in all mines.

That a court of arbitration be formed to settle disputes.

That the sanitary arrangements of the mines be improved.

That the restrictions now placed on miners moving from one district to another be removed.

That the working men be given control of the Miners' Co-operative Union.

That corporation labor be excluded.

That the power of employers to dismiss their workmen be limited, and that capital against labor be suppressed.

MEXICO.

SONORA.

ORO GRANDE COMPANY, LIMITED.—Judge Levy, at San Francisco, Cal., rendered an opinion on the 23d ult in the suit of this company against Manuel Aguayo *et al.*, involving the ownership of the Mulatos Gold Mine (see ENGINEERING AND MINING JOURNAL for April 5th, 1890). In his opinion the motion of the Sather Banking Company to set aside the order making it a party defendant is denied. The plaintiffs are allowed five days in which to apply for an injunction against the banking company, after which the present restraining-order will be set aside. The defendant's demurrer to the amended and supplemental complaint is also overruled by the court. Five days are allowed for an answer.

MEETINGS.

Franklin Mining Company, at Boston, Mass., October 24, at 10 A. M.

Horn Silver Mining Company, at New York, October 7, at 12 o'clock noon.

Pacific Electric Motor Company, at No. 12 Annie Street, San Francisco, Cal., October 8 at 10 A. M.

Paradise Valley Mining Company, at No. 328 Montgomery Street, San Francisco, Cal., October 8, at 2 P. M.

Sultepec Mining Company, at New York, October 7, at 3 P. M.

San Sebastian Mining Company, at New York, October 7, at 12 o'clock noon.

United Oil Company, at Denver, Colo., October 13, at 2 P. M.

Yuscaran Mining Company, at New York, October 7, at 2 P. M.

DIVIDENDS.

Caledonia Gold Mining Company (Black Hills), dividend No. 23 of eight (8) cents per share, $8,000, payable October 15, at the office of Laidlaw & Co., 14 Wall street, New York City. Transfer books close October 8 and re-open October 16.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alpha, Nev	5	Sept. 16	Oct. 22	Nov. 11	.25
Alta, Nev.	39	Sept. 1	Oct. 7	Oct. 29	.50
Best & Belcher, Nev.	47	Aug. 21	Sept. 25	Oct. 17	.25
Challenge, Nev	7	Sept. 26	Oct. 28	Nov. 17	.50
Goleta, Cal.	1	Sept. 16	Oct. 27	Nov. 24	.10
Gould & Curry, Nev	65	Sept. 16	Oct. 21	Nov. 13	.30
Humboldt, Nev	1	Aug. 16	Sept. 29	Oct. 25	.01
Kentuck	22	Aug. 18	Sept. 22	Oct. 14	.30
Leigh Gravel, Cal.	1	Sept. 3	Oct. 13	Nov. 5	.25
Live Oak D. Gravel, Cal.	12	Sept. 3	Oct. 9	Oct. 31	.05
Lockport, S. Dak.	6	Sept. 10	Oct. 10	Nov. 10	.002
Locomotive	8	Aug. 13	Sept. 18	Oct. 7	.05
Mayflower, Gravel, Cal.	48	Aug. 4	Sept. 6	Sept. 29	.20
Mono, Cal.	30	Sept. 18	Oct. 28	Dec. 2	.25
Occidental	7	Aug. 5	Sept. 11	Oct. 7	.25
Peer	9	Aug. 7	Sept. 12	Oct. 3	.10
Peerless	15	Aug. 14	Sept. 23	Oct. 14	.15
Silver King, Ariz.	4	Sept. 20	Oct. 28	Nov. 18	.30
Teresa, Mex	2	Aug. 13	Sept. 18	Oct. 8	.05
Transit, S. Dak.	2	Sept. 6	Oct. 8	Oct. 25	.001
Utah Con.	10	Aug. 5	Sept. 15	Oct.	.25
Weldon, Nev.	3	Sept. 3	Oct. 9	Oct. 30	.10

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 405 and 406

NEW YORK, Friday Evening, Oct. 3.

A quiet week at the Consolidated Stock and Petroleum Exchange. Prices are generally lower, and several favorite stocks have been weaker during the week than for some time past. This is nothing new, indeed, as these spells of inactivity have become so frequent as to be the rule and not the exception.

It is difficult to offer a plausible theory to account for the present dullness. Many explanations have been suggested, but none that will hold water. One broker goes so far as to tell us that the market for railroad stocks is off, and that, in sympathy with this downward movement, mining shares have started on a decline. We fail to see the connection between the two, or why it is that if the "bears" in railroad securities get the upper hand, mining will suffer.

We have heard complaints, many and loud, from brokers that they are unable to execute their commissions. It is alleged that holders of stocks decline to sell at present prices. It is perfectly natural that this should be so. We believe there are stocks which are cheap at the prices asked, and there are others which would be dear at any price, no matter how low. Before the Silver Bill caused the rise in the "white metal," dealers in mining shares predicted better times. At that time the mining market was dull. When silver was selling at $1.20 per ounce, the market was equally dull, and brokers contented themselves with expressing their astonishment at this state of affairs. It stands to reason that if a stock is worth having it is worth paying for, and if a person desires to buy a stock which he has ascertained to be a good one, he certainly should be willing to offer a fair price. Again, the other side should remember that the day of fictitious values has passed, and a stock which is not worth $5 cannot be sold for $100, as might have been the case in the times when the Comstock craze was at its height a few years ago.

Trading in the copper stocks has been resumed. One hundred shares of Atlantic changed hands at $22.13. Quincy was quiet at $116.25. Huron had two sales at $5.75 and $5.63, respectively.

Boston and Montana had one sale at $55.58. This was the only Montana stock traded in during the week.

Minnesota Iron Company, which for some weeks had not been traded in, was sold at $85, 200 shares having been disposed of.

Of the Black Hills stocks, 200 shares of Caledonia were sold at $1.75. Homestake was quiet at $10.25.

Among the Utah shares Horn Silver was weaker at $3.30; Ontario was quiet at $46.75 to $47, and Stormont had a solitary transaction at 7c.

Of the Colorado stocks American Flag had one sale at 4c. Crescent was traded in to the extent of 1,400 shares at 14@15c. Monitor had one sale at 2c. Breece advanced from 47c. to 52c., and was in some demand at the close. Catalpa was in moderate demand at 37@40c. Of Freeland, 3,800 shares changed hands, at 35@37c. Leadville Consolidated, for some reason or other, was one of the favorites, and 6,400 shares at from 15c. to 18c. were sold. Little Chief advanced from 40c. to 45c. This stock was also a favorite. Robinson Consolidated shows a solitary transaction at 50c., and 1,800 shares of Silver Cord were sold at 35@38c. There is a solitary sale of Small Hopes at 95c. Reference to this property will be found in our mining news column.

Among the California stocks we note sales of 2,500 shares of Astoria at 5c. to 6c.

Sutter Creek shows sales aggregating 400 shares at $1.35.

Brunswick Consolidated was largely dealt in at 7c. to 9c.

Bodie Consolidated was quiet this week, only one sale being reported at $1.50.

Mono was lower at 65c.

Plymouth struck a downward grade last week from which she has not recovered, and at the close the stock sold at $2.25, which is indeed lower than it has been for some time; in fact, we believe the lowest figure it has ever been quoted at.

Quicksilver preferred was stationary at $41.

Among the Comstocks Alta declined from $1.25 to $1.15. Barcelona had one sale of 1,000 shares at 15c. Best & Belcher was moderately traded in at $3.80@$3.95. Chollar was slightly lower at $3.30@$3.35. Julia declined during the week from 42 to 30c. with sales aggregating 1,500 shares. Mexican was fairly steady at $3.40@$3.55. Occidental had one sale at $2.25. Potosi also had but a sale at $7.13. Union Consolidated had another at $3. And Utah was steady at $1.20@$1.25. Consolidated California & Virginia shows but one transaction at $4.65 and Crown Point another at $2.90. Gould & Curry was sold at $2.30@$2.35. Hale and Norcross at $2.45. Our readers will find an interesting item of news in our mining news relating to this company. Ophir advanced from $5.13 to $5.38; Savage was stationary at $3.80 and Sierra Nevada at $3.15. Yellow Jacket had a solitary transaction at $3.50. Comstock Tunnel was in some demand at 17c., as was also Sutro Tunnel at 12@13c. Mt. Diablo had one sale at $3.35.

Of the Tuscarora we note sales of 400 shares of Belle Isle at 95c.@$1.

El Cristo was traded in to the extent of 1,800 shares at 75@80c. San Sebastian had one sale at 55c., and Rappahannock another at 6c. Mutual Smelting and Mining Company appeared in some demand at $1.45@$1.50. Of Silver King, 10 shares were sold at 40c.

Phœnix of Arizona declined during the week from $1.05 to 85c., but rallied at the close, and was sold at 99c. This stock seems to have been subjected to some mysterious pressure, although purchasers were found for all the stock offered, and in point of numbers it shows the largest transactions. The people most heavily interested in the property do not exhibit any particular anxiety about these manifestations, and consider that the actual state of the mine and its present and prospective outcome are satisfactory. The addition of 10 stamps to the mill has been completed, and the four concentrators purchased some months ago are at work. The only drawback has been some unavoidable mechanical delays in completing these and some other additions and improvements on the work. The mill now comprises thirty stamps, and is working steadily under President Bradstreet's personal superintendence on a large supply of ore. Current returns from the mine, it is stated, will show a marked increase.

Boston. Oct. 2.

(From our Special Correspondent.)

The copper stocks have had an ill turn the past week and prices declined to a much lower level than for six months past. There is no material change in the position of ingot copper to warrant the weakness in stocks; but there seems to have been a fear on the part of timid holders that the market price of the metal could not be maintained at 17 cents and so they attempted to unload, and the market yielded to the free selling, and, reaching stop orders, considerable stock was forced upon the declining market. The decline in Chili bars in London also helped to further the disposition to sell, on the expectation that the market on this side would respond; but so far there has been no material abatement either in price or demand. The decline in some of the leading stocks brought in a good supply of purchasing orders, and the market has rallied quite sharply to the demand, although prices are not fully up to the figures of last week.

Allouez, which for some weeks past has been one of the strongest stocks on the list, was raided quite sharply; a flood of stock coming on a weak market resulted in a decline to $5½, with a slight recovery to $6⅛.

Atlantic dropped from $23½ to $18¾, recovering to $21.

Boston & Montana declined from $58¼ to $53½ on liberal offerings, recovered to $56¾, but lost a portion of the advance, selling to day at $55½.

Butte & Boston declined to $16, but recovered to $18¼.

Centennial, which closed last week at $26, sold down to $21, and advanced to $22½. The reports from the mine are very good, the vein on the first level being 9½ feet wide and rich in copper. The stock is a good purchase to keep and will well repay the buyer.

Franklin suffered in the general decline; a lot of stock was forced upon the market when there were no orders to buy, and it dropped from $21 to $17 very easily, but as quickly recovered and sold again at $21 to-day.

Kearsage was also troubled with a weakness, reaching $15, but has since sold at $19, and is in fair demand. The mine is looking better in the lower levels.

Osceola sold down to $40, a decline of $6. It rallied to $43½, but later sold off to $42. The Opechee shaft has started up, and will add 75 tons to the monthly production. Quincy declined to $115 on forced sale of stock, a decline of $10 per share. The Pewabic matter doubtless helped the decline.

Calumet & Hecla and Tamarack both felt the force of the raid, being high-priced stocks and hard to sell on a declining market. The former sold down to $295, the lowest price since May 10. It recovered to $300, and holds quite firm at that figure. Tamarack dropped from $205 to $184, and recovered to $200 to-day, which it did not hold, selling off again to $195.

Huron sold at $5⅛ as the lowest price, rallying to $5⅝. Santa Fe declined from 60c. to 52½c. and Bonanza from 65c. to 50c. Arnold sold $1½; Ridge at 87½c. Central declined to $20, a loss of $4, and Pewabic advanced to $14½ for 300 shares.

In silver stocks, Catalpa sold at 35c.; Dunkin at 60c.@65c. The reports from the Dunkin mine are favorable and we look to see the stock advance considerable over present prices. Breece is in good demand, selling at 45c.@47½c.

By Telegraph.—Allouez, $6½; Atlantic, $20 bid; Boston & Montana, $54⅜ bid; Calumet & Hecla, $300; Franklin, $21; Kearsarge, $18½; Osceola, $41; Quincy, $115; Tamarack, $191.

Denver. Sept. 29.

(From our Special Correspondent.)

A gradual improvement in prices and sales is noticeable for the past week. Renewed confidence in the stability and permanency of the Exchange is being expressed upon all sides, and greater interest is being taken by prominent holders of

membership certificates, who in the past did not show much of any. The listed properties are now receiving that attention in regard to development that will undoubtedly place some of them upon a dividend-paying basis.

There should be more shipping of ore from such a long list of properties that are supposed to have been thoroughly worked since having been placed on the market for speculation in certificates of stock. The strike of the switchmen in the Union Pacific yards here has been a detriment in the handling of ores, so much so that some of the smelters and ore buyers have been compelled to restrict buying in a measure. Output, however, is large and miners still in demand. Winter work will far exceed any of past years. Preparations for Exchange building are being pushed as rapidly as possible. The question is often asked, why do not Eastern owners of properties, when all looks so favorable, show more interest in their holdings and do some work upon them. Many resident miners are securing bonds and leases upon such properties.

Prices and sales for the week ending Sept. 27th :

Company.	Opening.	H.	L.	Closing.	S.
Alleghany, Colo	†15¼	†15	12¾	12½	1,500
Amity, Colo	†04¾b	04	03½	03¼	3,400
Bangkok, C. B., Colo	03¾b	*10¼	08½	10	21,500
Bates-Hunter, Colo	45b	49	46	49	12,400
Brownlow, Colo	08½b	08¾	07¾	07½	800
Calliope, Colo	30b	33b	30b	32	.....
Cash, Colo	10b	15b	12	15	500
Clay County, Colo	*75	75	69	66	3,360
Hard Money, Colo	03½b	04b	03¼b	0 ½	.....
Leavenworth	54b	†6	54	55	7,600
Little Rule, Colo	68	70	68	70	5,400
Matchless, Colo	200b	200b	150b	200	.....
May-Mazeppa, Colo	79b	*83	76	80	21,100
Mollie Gibson, Colo	30b	30b	30b	30	.....
Oro, Colo	.....	250b	100b	200	.....
Pay Rock, Colo	05¼	05¼	04¾	05¼	8,800
Puzzler, Colo	10¾b	11	10	10½	9,000
Reed-National, Colo	70	71	69	70	800
Running Lode	16b	16½	16¼	16¼	1,000
Silver Cord, Colo	30b	30b	30b	30	.....
Whale, Colo	21b	22½	22½	21½	100
Prospects:					
Argonaut, Colo	27½b	27½	26	27½	19,200
Aspen United, Colo	....	05	05	04½	400
Big Indian, Colo	16a	*12	09½	10½	5,400
Big Six, Colo	09¾b	*07¼	03½	06½	4,.00
Century, Colo	.....	20b	19½b	20	.....
Claudia J. Colo	08½b	08½	07¾	08	2,600
Nat. G. & Oil Co	*18	*19	16	17½	7,400
Diamond B., Colo	03¼	*04¼	03¼	03¾	13,900
Emmons, Colo	26½	*30	26½	27¼	11,300
Golden Treasure, Colo	14b	20	19½	24	3,900
Ironclad, Colo	*18	*18	15	15	3,600
John Jay, Colo	16	*20	16	15	1,400
Justice	.....	12	12	11½	200
Legal Tender, Colo	03b	03¼	03	03	900
Morning Glim, Colo	36b	48	41	45	2,000
Park Consolidated	20½	*28	20¼	23½	19,500
Potosi, Colo	08b	(8¾	08¼	08	500
Rialto, Colo	55b	*71	55	67	17,800
Total for the week					215,700

*Buyer 30 days. †Buyer 60 days. ‡Seller 60 days. §Seller 30 days. a Asked. b Bid.

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25 00	$55.00	$60.00
Aurora Iron Co	25 00	7.50	8.50
Champion Iron Co	25 00	115 00	125.00
Chandler Iron Co	25.00	41.00	43.00
Chicago & Minn. Ore Co	100.00	116 00	120 00
Cleveland Iron Co	25.00	16.50	17.50
Germania	25.00	11.50	12.00
Jackson Iron Co	25 00	110.00	125.00
Lake Superior Iron Co	25 00	68 00	72.00
Milwaukee Iron Co	25.00	5.50	6 50
Minnesota Iron Co	100.00	86.00	89.00
Montreal Iron Co	25.00	9.00	10.00
Norrie (Metropolitan)	25.00	73.00	75.00
Odanah Iron Co	25.00	21.00	22 00
Pittsburg Lake Angeline Co	25.00	175.00	185.00
Republic Iron Co	25.00	41.50	42.50

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Min. Co	....	....	....
Grayling Gold & Silver Co	$25.00	....	....
Michigan Gold Co	25.00	*$1.35	....
Peninsula Gold & Silver Co	25.00	....	.50
Ropes Gold & Silver Co	25.00	1.75	*$2.00

* Assessment paid.

Salt Lake City. Sept. 27.

Company.	Opening.	Highest.	Lowest.	Closing.	Sales.
Alice, Mont	2 50 b	2 55 b	2.50 b	2.55 b	....
Alliance, Utah	2.40 b	3.05 b	2.40 b	3.05 b	100
Anchor, Utah	6 00 b	6.25 a	6.00 b	6.25 b	100
Apex, Utah	.17 b	.19 b	.17 b	.19 b	6500
Barnes, Utah	.08 a	.09 a	.05 b	.07 b	500
Cent.-Eureka, Ut.	30.00 b	31.00 b	30.00 b	31.00 b	....
Congo	12½ a	12½ a	12½ a	12½ a	....
Crescent, Utah	.25 b	.28 a	.25 b	.27 b	4100
Daly, Utah	23.35 b	23.75 a	23.00 b	23.50 a	....
Glencoe, Utah	1.25 b	1.00 b	1.75 b	1.75 b	100
Horn Silver, Utah	3.60 b	3.60 b	3.60 b	3.60 b	....
Malad Con., Id	.05 b	.05 b	.62 b	.03 b	100
Mammoth, Utah	3.70 b	3.90 a	3.70 b	3.75 b	....
Nabob	.....	.....	.....	.01½ b	....
Northern Spy	.....	.....	.....	.....	....
Ontario, Utah	47.00 b	47.00 b	47.00 b	47.00 b	....
Stanley	.....	.....	.....	.....	....
Utah L. & C. Co	8.00 b	8 75 a	8.00 b	8.75 a	200
Utah & Mont	.....	.....	.....	.....	....
Utah Oil Co., Utah	.10 b	.12 b	.10 b	.12 a	2,500
Woodside, Utah	1.00 b	3.00 b	1.00 b	2.75 b	....
Total					14,200

*Buyer, 30 days. †Seller, 30 days. ‡Assessment paid. a Asked, b bid.

Kansas City. Sept. 29.

Company.	Opening.	H.	L.	Closing.	Sales.
Argonaut	14 a†	30†	14½†	30†	.....
Bates-Hunter	42†	50†	42†	50†	.....
Big Six	9½†	10†	8½†	10†	.....
Brownlow	.....	.....	.....	.....	.....
Cash Gold	15	15	15	15	900
Clay County	40†	.....	.....	40†	.....
Diamond B	4¾*	6*	2½§	5½*	2 700
Hard Money	8†	8†	5½	5½	.....
Hunki Dori	10	11½*	10	....	600
Iron Clad	....	....	....	....	.....
Kansas City M. & M. Co	2.00	2 70‖	2.60	2 60	190
Kansas City, Col	13*	....	....	...	.....
King Jack	....	....	....	....	.....
Leavenworth	55	....	....	55	.....
Little Nugget	1.06*	1.10†	1.06*	1.10*	400
Little Rule	62†	65½†	62†	65½	.....
May Mazeppa	78*	82‖	78*	82‖	2,100
Minnequa Zinc M. Co	11†	15½*	11†	15½*	8,700
Monte Cristo	28*	5*	2‖*	5*	800
Morning Glim	41‡	....	....	...	.....
Pay Rock	5	5	5	5	100
Pelican	30‡	...	....	....	.....
Potosi	25‡	...	....	....	.....
Running Lode	16‡	16½	....	16½§	100
Sylph	11§	15	10§	15	800
Total					17,390
Pit sales					4,000

†Bid. ‡ Asked. * Buyer 30. § Seller 30. $* Seller 60. ‖Buyer 60.

St. Louis.

(From our Special Correspondent.)

Prices and sales for the week ending Wednesday, Oct. 1, 1890.

Company.	Opening.	H.	L.	Closing.	Sales.
Adams	$2 00	....	1.15	1.90	....
American & Nettie	1.12½	....	....	1.00	2,000
Central Silver	.17½	....	....	.13¾	1,100
Cleveland-Colo	.04½	....	3½	.04½	1,600
Cleveland-Idaho	.1 ½	....	....	.9	200
Granite Mountain	44.75	....	....	44.00	....
Gold King	.15	....	....	.9	200
La Union	.08	.08½	....	.07½	11,500
Little Albert	.32½	.35	....	.33¾	....
Mickey Breen	1.60	.85½	.57½	1.05	700
Maj. Budd	.08	....	....	.6½	....
Mountain Key	.48¾	....	.45	.47½	....
Montrose Placer	.55	.60	....	.53¾	300
Pat Murphy	.14½	....	....	.14	1,000
Small Hopes	.95	....	....	.90	....
Silver Age	2.00	2.30	....	2.17½	200
Tourtelotte	.03	....	....	.01	100
West Granite	.96	....	....	1.00	100
Yuma	.47½	....	....	.34¾	1,200
Total					20,100

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The oil markets this week have been very dull and lower, and speculation in them is still in a complete state of stagnation. Lima oil has sold down to 25 cents a barrel, which, we think, is a low enough price to justify purchases. The Standard pays 35 cents in the field for the same oil, and while there is no speculative spirit in the oil market, and consequently no promise of an immediate improvement in prices, we firmly believe that purchases around 25 will show a handsome profit before six months, and probably before 30 days elapse. There has been an increase in the production of Pennsylvania oil, and speculation in it, too, has been at a very low state. We should prefer to buy the Ohio oil rather than the Pennsylvania at present prices. One thing which operates seriously against bull speculation in petroleum is the bearish tendency of the stock market, and a feeling of unrest and almost uneasiness in financial circles.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 27	79½	79⅝	79½	79⅝	20,000
29	80½	80½	80½	80½	17,000
30	80¾	80¾	78	78	22,000
Oct. 1	77⅛	78½	77	78½	57,000
2	78	78¾	77⅝	77⅝	34,000
3	78	78	77¾	78	31,000
Total sales in barrels					181,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 27	80	80½	79¾	79¾	9,000
29	80	81¼	80	80¼	83,000
30	80½	80½	77	77¼	81,000
Oct. 1	80½	80½	78⅛	79	88,000
2	79¼	80	79	79½	42,000
3	79⅜	80¼	79¼	80¼	25,000
Total sales in barrels					328,000

BUCKEYE PIPE LINE CERTIFICATES.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 27	*	....	....	....	.....
29	*	....	....	....	.....
30	*	....	....	....	.....
Oct. 1	28	28	28	28	10,000
2	27	27	27	27	23,000
3	....	....	....	....	.....
Total sales in barrels					33.000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 27	*	....	....	....	.....
29	*	....	....	....	.....
30	28	30½	27¼	27½	30,000
Oct. 1	28	28	26	26¾	25,000
2	26½	29	25¼	25¾	12,000
3	25½	25½	24½	24⅞	27,000
Total sales in barrels					94,000

* No sales.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, October 3.

PRODUCTION OF BITUMINOUS COAL for week ending September 27th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R	4,523	99,702	55 842
Cumberland, Md	*78,295	2,806,529	2,290,458
Barclay, Pa	*3,071	112.321	84.398
Broad Top, Pa	10,828	374,048	240,082
Clearfield, Pa	69,597	2,772.219	2,288,971
Allegheny, Pa	22.464	953,349	586,550
Beach Creek, Pa	35,354	1,380,667	1.111, 77
Pocahontas Flat Top	33,195	1,401,566	1,258,595
Kanawha, W. Va	*43.271	1,515,219	1,342,280
Total	301,598	11,414,620	9,228,553

* Estimated.

WESTERN SHIPMENTS.

Pittsburg, Pa	21,291	608,046	467,392
Westmoreland, Pa	14,835	855,704	1,084,514
Monongahela, Pa	13,561	380,547	296,440
Total	49.687	1,844,297	1,848,316
Grand Total	351.285	13,258,917	11,076,899

PRODUCTION OF COKE on line of Pennsylvania R. R for the week ending September 27th, and year from January 1st, in tons of 2,000 lbs.: Week, 106,256 tons; year 3,926,060 tons: to corresponding date in 1889, 3,203,877.

Anthracite.

The hard coal trade is in a tolerably satisfactory position. The market is firm. Coal is, if anything, a little scarcer, and there is very little suspicion of cutting below the scale to secure business. Although the stocks in the retail yards have not been appreciably reduced during the week, there is every indication of a movement in that direction. Many of the largest retailers have been in the market buying for future delivery at September prices; but very little, if any, business has been done at the October rates.

Lack of car facilities all round is the greatest trouble operators have to contend with just now; and a very large tonnage is standing at the mines which should be moving hitherward. One company (the Lehigh & Wilkesbarre) lost fifty-one hours of mining during the week from this cause. There appears to be no immediate prospect of relief on any of the railroad lines. Labor, too, has continued scarce, with no improvement on last week's state of affairs. The coal operators state that they could find work for several hundred men additional. A representative of the New York, Susquehanna & Western Coal Company stated to-day that he could employ 300 to 400 more miners if he could secure them. But the men show no disposition to return from the soft coal regions.

If the output for the month, 3,500,000 tons, is lived up to, it will compare favorably with the tonnage mined in October, 1889, 3,711,820 tons, and with one or two cold snaps at the termination of the "Indian summer" the general expectation of a brisk fall trade would seem to be justified, especially as the October prices are lower than those of 1888 and 1889. The most marked difference in this respect is in chestnut, which was $4.65 in 1888 and is $3.95 in 1890.

The scale agreed upon by the sales agents for the month is: Stove, $4.30; egg, $4.05; chestnut, $3.95; broken, $3.75.

Pea and buckwheat are recovering lost ground rapidly, being now fairly firm, though prices remain as last week: Pea, $2.25; free-burning, $2.60 @ $2.75 on board. Buckwheat, Lehigh, $1.60; free-burning, $1.80@$1.85 on board.

Bituminous.

The scarcity of cars has temporarily checked the supply of bituminous coal in this market, just as it has in the anthracite trade. Operators all claim to be short and unable to take much new business and guarantee early delivery. Stocks are growing heavy at the mines, which is not an unmixed evil in view of the strained relations between the operators and the miners in several districts

As we stated last week, the trouble in the Clearfield region continues, and is further accentuated by later developments. Since the convention at Altoona on the 10th ultimo there has been no little uneasiness and doubt about the new scale which was to go into operation on the 1st instant. Since then the operators and some of the miners have positively refused to sign the agreement. The men in the Punxsutawney collieries, Jefferson county, did not go to work on the 1st inst., and called a mass meeting, the result of which is not known here yet, except that a threat of a general strike is made in many places and echoed approvingly in others.

The increase in the consumption of bituminous coal for manufacturing and steam-generating purposes seems to have been so marked of late that a number of real estate men in Brooklyn have petitioned the Board of Aldermen to restrict or prohibit its use within their jurisdiction. No action was taken in the matter. It is generally known in the soft coal trade that several inventors are now devoting their attention to devise a method by which perfect combustion of soft coal can be secured and the smoke nuisance thus avoided. "In most cases," remarked one large operator, "the trouble is due to the inexperience of the firemen. An experienced fireman can burn

soft coal with a comparatively trifling smoke or soot."

The news that American soft coal is now successfully competing with English coal in the West Indies and South America has given something of an impetus to business here, and operators are looking that way for orders to fill as soon as they can rely upon the supply from the mines. Several large steamers, of 3,000 to 4,000 tons capacity, are beginning to load up with coal for the South. An order was recently received from Brazil for 5,000 tons. At other points, notably St. Lucia, Porto Rica, Rio Janeiro, Aspinwall and other parts of Colombia, Vera Cruz, Havanna, etc., American coal is now demanded and is being supplied, and in successful competition with Cardiff coal.

There is little change in ocean freights, except that Baltimore prices are a little weaker. A fleet is expected to arrive within a few days, which may relieve the market somewhat.

Nominal prices are: At Baltimore, $2.40@$2.50, f. o. b, Philadelphia, $2.50@$2.60; in New York harbor, $3.25; alongside, $3.50.

Baltimore.

(From our Special Correspondent.)

Prices in cars on track, or in dealers' yards to trade, Oct. 1st, are as follows:

	Hard white ash.	Shamokin.	Lykens Valley.
Lump and steamer	$4.20	....	....
Broken	4.20	$4.20	$4.35
Egg	4.30	4.30	4.45
Stove	4.45	4.45	4.70
Chestnut	4.30	4.30	4.35
Pea	3.00	3.00	3.25
Buckwheat	2.50	2.50	2.75

Afloat alongside, by cargo, 15 cents less than by cars.

Boston.

Oct. 2.

(From our Special Correspondent.)

The anthracite market presents little that is new. The increase instituted at the sales agents' conference last week fell upon the market in a most unassuming manner. The début of the new prices October 1 was particularly modest. They had been reckoned upon and their introduction did not have the slightest effect upon the market at this point. The tone of the market is very firm, while a general quietness prevails. There is a small graduated movement noted. Apart from the fact of the condition of the supply at tidewater, the stocks of the retailers are still very large and with but few exceptions they are not buying and do not evince signs of resuming buying for a short period at least. Up to the present but few sales have been made at the new prices, which rule as follows, f. o. b. at Philadelphia: Hard broken, $3.90; egg, $4.15; stove, $4.30, and chestnut, $3.95.

Bituminous coal remains dull. The market here is in a stagnant condition, outside of the old business which is commanding the attention of the dealers. The advance in all rail rates, which promised to come long before this, has not materialized as yet. An apparently well informed agent here puts the rail advance, at the outside, to be not over a range of 10 to 20 cents on sizes. There is a moderate inquiry for gas coal which bids fair to improve, as many of the large consumers are not in possession of even fair sized supplies.

Freight rates have not acted quite as was commonly expected. Instead of stiffening up and improving, recent charters show that, if anything, they are weaker. A charter is reported from Baltimore to Portsmouth at 90c. This surprisingly low rate certainly does not indicate a firmer feeling in freights. Vessels are not offering freely, however, and it is thought a few weeks of stormy weather is all that is necessary to make a decided change in transportation figures. The ruling prices are 50c. from New York, 75c. from Philadelphia and $1 from Baltimore.

The retailers have not yet fairly started on the fall trade. There is a moderate inquiry which is by no means as large as the trade predicted for October 1st. The summer temperature which prevailed during the past week caused a positive check in consumption. On the other hand, buying received a temporary impetus from the sales agents' advance. Public opinion looked for this advance to reflect into the retail market, and consequently some purchases were made. Retail prices are unchanged, the coal exchange figures generally prevailing. The wharves of the dealers are filled to the brim, and not until they are rid of a considerable part of this big stock is even a small advance probable. The competitive firms have ceased sacrificing their stock, and, while acting independently of each other, one figure rules.

Chicago.

Oct. 1.

(From our Special Correspondent.)

Though not a particularly active one, with purchasers usually in a small way, the Chicago coal market is firm at the advance of 15 cents per ton, decided upon at a meeting of Western agents held this city last week, to go into effect to-day. Receipts via lake are somewhat larger, but movement from the East per rail shows no special increase, and the shortage at this center now is reported up to 200,000 tons and still daily increasing through insufficiency of car service. At a meeting of the Chicago Coal Exchange, held last week, it was unanimously decided not to increase retail prices during the present month. Present figures, therefore, remain: Large egg, $6.25; small egg, range and chestnut, $6.50. On cars, f.o.b. Chicago, per net ton: Large egg, $5.40; small egg, range and chestnut, $5.65. A general advance of 50 cents per ton upon the present retail prices is predicted for November.

A good demand for bituminous continues, but the same trouble exists as in the anthracite trade as to difficulties in transportation. The anticipated strike among Illinois miners is reported averted by the submission of mine owners to the demands of the operators. The supply for this market is insufficient, and prices of the product of several mines have been advanced. Quotations per ton of 2,000 pounds are: Erie, $4.25; Pittsburg, $3.30; Indiana block, $2.50@$2.65; Blossburg, $4; Greene and Sullivan county (Ind.) shaft, $2.25@$2.40; Jackson Hill, $3.25; Jackson Shaft, $3.25@$3.40; Hocking Valley, $3.20@$3.30; Youghiogheny, $3.50.

In this market there exists a brisk demand for coke, which is also hampered by short supplies. Elk Lick has been advanced 15 cents; for Connellsville 72-hour, $5.20; domestic crushed, $4@$4.25; Elk Lick, $4.40 per ton of 2,000 pounds f.o.b. Chicago are the quotations.

Pittsburg.

Oct. 2.

(From our Special Correspondent.)

Coal.—The market remains steady, with a fair trade demand. The late coal run was a very successful one; the largest portion went direct to New Orleans. Prices in the lower markets are said to be satisfactory. The pools are nearly bare of coal; miners do not seem anxious to work.

Nominal rates in pools:

Per 100 bushels.		Per 100 bushels.	
1st pool	$4.75	3d pool	$3.90
2d pool	4.50	4th pool	3.25

Railroad coal, $5.00@$5.50.

Coke, Connellsville.—The market continues very firm, the only drawback on trade at present being the scarcity of cars. Railroad men generally are using their best endeavors to supply the deficiency. A few days since two solid special trains of coke were sent to the furnaces at Cleveland. Last week's shipments increased over 100 cars. Stock coke is being reduced somewhat, but a partial suspension of some of the works is threatened on account of the large amount of coke on hand. Week's shipments, 6,620 cars; previous week, 6,355.

The rates were for 2,000 pounds f.o.b. cars at ovens: Blast furnace coke, $2.15; foundry coke, $2.45; crushed coke, $2.65.

Freights to Pittsburg 70c. per ton; Mahoning and Shenango Valleys, $1.35; St. Louis, $3.35; Cleveland, $1.70; Chicago, $2.75.

METAL MARKET.

NEW YORK, Friday Evening, Oct. 3.

Prices of silver per ounce troy.

Sept.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Oct.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
27	4.84	51 11/16	1.12	1	4.86	51½	1.12¾
29	4.84	50¾	1.10	2	4.86½	51½	1.13
30	4.85	50	*	3	4.86¾	51½	1.13

* 1.19½ and 1.11.

Silver declined to 1.10 owing to the Government having purchased its quota before the end of the month, coupled with the fact that the London buyers were out of the market on account of the stringent money market and depressed eastern exchanges. The Government resuming purchases on Wednesday has caused the improvement indicated above.

The United States Assay office, at New York, reports total receipts of silver for the week to be 95,000 ounces.

Silver Bullion Certificates.
NEW YORK STOCK EXCHANGE.

	Price. H.	Price. L.	Sales.
Sept. 27	112⅜	112	25,000
Sept. 29	112	110½	367,000
Sept. 30	112⅜	109⅝	822,000
Oct. 1	114⅛	113	1,090,000
Oct. 2	113⅜	113⅝	282,000
Oct. 3	113⅜	112¾	115,000
Total sales			2,701,000

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate for discount, and it remains at 5 per cent. During the week the bank lost £963,000 bullion, and the proportion of its reserve to its liabilities was reduced from 41 to 33·50 per cent., against a reduction from 42·15 to 33·30 per cent. in the same week last year, when its rate for discount was 5 per cent. On the 3d instant the bank lost £152,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 12,675,000 francs gold and a loss of 5,100,000 francs silver.

United States Mints.

Coinage executed at the mints of the United States during September:

Denominations.	Pieces.	Value.
Double eagles	80,699	$1,613,980
Eagles	8	80
Half-eagles	10	55
Quarter-eagles	21	52.50
Dollars	.....	.....
Total gold	80,738	$1,614,162.50
Standard dollars	3,050,000	3,050,000
Dimes	1,314,954	131,495.40
Total silver	4,364,954	$3,181,495.40
Five cents	662,200	33,110
One cent	3,660,200	36,602
Total minor	4,322,400	$69,712
Total coinage	8,768,092	4,865,369.90

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars	$ .86	$ .88
Mexican dollars	.85½	.88
Peruvian soles and Chilian pesos	.80	.81
English silver	4.82	4.86
Five francs	.94	.95
Victoria sovereigns	4.84	4.93
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.78	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.12¾	1.13

Copper.—The market has been extremely dull during the week, and some efforts have been made to depress prices artificially in this country, as well as abroad. Some success was obtained, inasmuch as Chili bars gave way in London on Tuesday last to £59, and here a few parcels of second-hand casting copper were sold at even a trifle below 14¼c., New York, and a few second-hand lots of lake copper at 16¾c., but when these parcels where out of the way, the market immediately resumed a firmer tendency, the more so as no more lake copper can be had below 17c., and even at this price only for near delivery. Much as we would like to see values somewhat lower than they are just now, there are certainly for the moment, or for the near future, no grounds for alarm. The statistical position is an excellent one, trade being good everywhere; consumption is going on steadily, and a few quiet weeks, such as we have had lately, will only be beneficial, in so far as they will check further advance. We certainly fail to see why prices ought to decline, but should this happen, there is no doubt that a recovery would speedily follow. The recent advances reported from abroad have now brought us near to the point where shipments of copper can be resumed to Europe; but as we have practically no surplus stocks yet which we can spare for the moment, this is not likely to take place at a very early date, as when this point is reached prices will either have to advance here or drop in Europe. The week is closing with a decidedly better tendency, and it is evident that consumers are adopting the wise course of covering the raw material for all orders which they take for future deliveries. We quote lake copper at 17; Arizona copper at 15½, and prime casting copper at 14¾@14½.

In London prices experienced rather a sharp decline, G. M. Bs. reaching the lowest point on Tuesday, when business was done at £59 spot cash, but since then prices have steadily advanced, and the closing prices are G. M. B. £60 5s. cash, £60 12s. 6d. three months; English tough, £63@£63 10s.; best selected, £67@£67 10s.; India sheets, £70@£71; strong sheets, £73@£74, and yellow metal at 6½@6⅝.

Our cable from Europe reports that the statistics at the end of the month do not show any alteration.

The exports of copper during the past week were as follows:

To Liverpoool—	Copper matte	Lbs.	
S. S. Wisconsin	3,803 bags	404,443	$40,000
S. S. Britannic	3,942 bags	442,449	40,000
S. S. Berlin	6,725 bags	731,553	65,000
S. S. Spain	3,943 bags	442,874	44,000
To Rotterdam—	Copper.	Lbs.	
S. S. Maasdam	138 cakes	22,482	4,000

Tin.—Early this week some steamers arrived bringing in supplies, which somewhat appeased the great scarcity of the metal, and in consequence prices gave way a little for spot and near delivery, but not to any large extent, as importers remain rather firm, and are evidently more or less afraid that they will again run short of supplies. The statistical position of the article is a very good one. We quote to-day: Spot, 24·25; October, 23·75; November, 23; December, 22·75.

The London market opened at £103 3s.@£103 5s. for spot tin, but afterward declined to £101 10s., and closes firmer again at £102 7s. 6d. Three months' tin remains neglected, and is still rather lower than spot, being obtainable at £99 10s. Stocks in London have declined to 2,640 tons, which is considerably less than at any time during the last few years.

Lead.—The advance has made further progress, and it is now an established fact, beyond doubt, that there are no reserve stocks anywhere in this country. Prices have been bid up for carload lots on the spot at 5·55, without bringing out any lead. Whatever is produced by western smelters is quickly absorbed in Chicago and St. Louis, and other Western centers, and here on the Eastern coast we are now dependent on supplies from Europe. As far as we can ascertain, some 2,000 to 3,000 tons have already been purchased from abroad, but as hardly any of this lead will arrive here before the end of this month (and the bulk of it only in November), no material decline can be expected for some weeks to come.

In Europe stocks of lead have not been large at all and the draining of what was there, has been sufficient to drive up prices very quickly. Spanish lead, which was quoted a fortnight ago at £13 10s., is not now obtainable any further at £14 10s., and our cable reports that spot lead is very scarce, and, besides, shippers experience difficulties in engaging freights, as all-route steamers are full. Our market is now more or less at the mercy of Europe and prices here will be regulated according to the London market.

American smelters will now be able to again take advantage of the new tariff and purchase Mexican ores, but in the meantime the trade has had to pay very dearly for the luxury for shutting out these valued ores from our market.

St. Louis Lead Market.—Messrs. John Wahl & & Co. telegraph us as follows: "Spot lead is difficult to obtain, and it is only occasionally that it can be got. The metal has been sold all the way from 5·20c.@5·37½c. A few hundred tons of Nor dec lead were sold at 5c.@5·05c."

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "Prices have again been marked up, and spot lead is as difficult to obtain as ever. Sales have not been large, owing to the scarcity of the metal. The closing is very firm at 5·30c. bid for October lead, and there is very little offering for any delivery."

Spelter has been largely in demand at continually advancing prices, makers being almost entirely sold out for October shipment. We quote to day 5·80@5·90c. delivered in New York. A fair amount of business has already been done for November and December delivery.

Antimony has been dull, and prices have eased off a trifle. We quote Cookson's at 22½@23c.; "L X," at 20½@20¾c., and Hallett's at 19¾@20c.

Quicksilver.—The London quotations are unchanged at £10 10s., but New York prices have advanced to $57@$58. The importations of quicksilver have of late been unusually heavy, some 2,000 flasks having been brought in during September. This is attributed to an anticipation of impending higher duties, due to the Tariff Bill.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, October 3.

The close of the month just past has brought with it no appreciable change in the iron market, and there are no indications of an immediate or radical alteration in the general features which have characterized it for some weeks past. In this section the production and the consumption are fairly balanced. It is impossible to predict with any great amount of certainty what the future will bring forth, but from present indications there is not much likelihood of an immediate change in the situation, either one way or the other.

American Pig Iron.—The volume of business transacted during the current week is reported as good, but the trading has been of a hand-to-mouth nature. Consumers seem unwilling to buy in great quantities, but as the aggregate of their orders is large, there has not been any accumulation of stocks on the part of furnace men. In fact, No. 1 foundry iron is reported as scarce, and it certainly has no difficulty in finding buyers. Less Southern iron is being brought to this market, but it has not resulted in higher prices for the Northern product. The situation is essentially as reported last week in this column, and quotations have undergone no marked change. We quote this week: Northern iron, No. 1 X, $17.50@$18; No. 2, $16.50@$17; Southern, No. 1, $16.50@$17.50, and for No. 2, $15.50@$16.50.

Scotch Pig Iron.—The Glasgow market is reported in an exciting condition, owing to impending labor difficulties. To-morrow the two-weeks' notice given by the furnace men will expire, and the iron masters have thus far emphatically stated that they will not grant the desired advance in wages. In all probability, therefore, the result will be the closing down of all Scotch furnaces. It is not expected that the strike will last long. A prominent importer in this city said that a compromise would be effected, whereby wages would be increased, in which case Scotch pig iron will see an advance. The article, however, does not affect our home markets, and no fears need be entertained. A few sales occurred during the week at our last quotations, which we repeat: No. 1 Coltness, $24.50; Dalmellington, $22; Eglinton, $21.25.

Spiegeleisen and Ferro-Manganese.—There has been nothing of any moment in either of these, and sales have been conspicuous by their absence. Buyers appear to be well supplied, and lack of business is the result. Our quotations this week are: For 20 per cent. spiegeleisen, German, $30.50; for English $31.50. For ferro-manganese, 80 per cent., $71 is quoted for November and December delivery, but it is not unlikely that lower figures would be accepted for desirable orders.

Steel Rails.—Rails are, if anything, weaker. A sale of some 6,000 tons to the Delaware & Hudson Railroad is reported, but the price could not be ascertained. Outside of this we hear of no sale of any consequence. Business continues small, and the current quotation this week is $30. It is said that an even lower figure would be accepted by certain Eastern mills, if a desirable order were given.

Rail Fastenings.—No change either in prices or in excessive dullness. The quotations herewith given must be regarded as merely nominal, as no business has transpired upon which to base actual figures. Spikes, 1·95@2c.; angle plates, 1·72@1·76c.; bolts and square nuts, 2·70c.; hexagonal nuts, 2·90 @2·95c.; complete joint, iron and steel, according to weight.

Tubes and Pipe.—No complaints as to lack of business are heard from the manufacturers of tubes and pipe. There is no scarcity of orders, and everybody is busy. The association meets next week, but no changes are anticipated. Ruling discounts on car lots: 47½ per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47½ on lap, galvanized; 40 on 1¾-inch boilers; 50 for 2 to 4-inch, and 52½ on larger than 4-inch casing, all sizes, 50 per cent.

Merchant Steel.—A dull week is reported by dealers in merchant steel, but prices have not declined to any extent. Quotations remain: Best English tool steel, 15c. net; American tool steel 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2·60c.; open-hearth spring, 2·60c.; tire steel, 2·60c.; toe calks, 2·60c.; flat file, 4¾c.; mill file, 5½c.; taper file, 7¼c.; first quality sheet, 10c.; second quality sheet, 8c. Park, Brother & Co., of Pittsburg, Pa., are pressing the sale of American steel in England. For some time past they have had representatives "on the other side," and they are endeavoring to compete with British makers.

Old Rails.—Not much actual business was transacted in old rails during the week. Holders' views are above buyers', and the latter are not eager to buy at present quotations, which are: $25.50@$26 for tees and $26.50@$27 for doubles.

Structural Iron and Steel.—The labor troubles in the building material market have at last made themselves felt in this branch of the iron market. The work under review has been a dull one, with quotations ruling as follows: Universal plates, 2·25@2·28c.; bridge plates, 2·15@2·20c.; angles, 2·10 @2·15c.; tees, 2·65c.; beams, 3·10c.

Chicago. Oct. 1.

(From our Special Correspondent.)

All of Chicago's industries consuming ore, iron and steel report generally a very satisfactory state of business, with perhaps an exception as to the pig iron market; yet the furnace men and dealers look forward to the future with much confidence, as the production is not overcrowding consumption. Demand for small quantities from the smaller consumers for immediate use is good. Lake Superior charcoal and Northern coke irons continue inactive, as is usually the case at this season of the year; although all the furnaces are reported well sold up. Southern cokes are relatively weaker than other classes. Certain furnaces which have been cutting prices now show a disposition to withdraw from the market for anything in the way of early deliveries. Softeners are in moderate demand for small lots.

Considering the heavy demand for finished material, the crowded condition of machine shops and foundries, the present quotations in the pig iron market are a source of some disappointment to furnace men and dealers. A heavy consumption of finished iron has been a prominent feature of this market for many weeks. Many concerns have been obliged to decline further business on account of inability to complete within the period specified. The amount of iron now being melted is greater than at any previous time, and indications all point to a continuance of activity in this direction.

Pig Iron.—The market is quiet, with no notable change in prices. The late tightness in financial circles may have had the effect of keeping some buyers out of the market for a time. The production is enormous, yet there is no disposition among dealers to make any concession in prices, although these prices have not been so low since June of last year. Consumption continues very heavy also. Many consumers are taking in iron faster than called for by contract. Values undoubtedly will be well sustained. We quote to-day for cash per ton of 2,240 pounds, f. o. b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, $20@$21; Lake Superior coke, Bessemer, $18.50; Lake Superior coke, Bay View No. 1, $17@$17.50; No. 2, $16@ $17; No. 3, $15.50@$16; Southern coke No. 1, $16.50@$17; No. 2, $16@$16.50; No. 3, $15.50@$16; Southern charcoal, $19@$19.50; standard Southern car wheel, $22@$24.50; Ohio softeners, Hanging Rock, $18@$18.50; Jackson County, $18@$50; Hanging Rock, cold blast, $26@$28; warm blast, $23@ $25; No. 1 Scotch, according to brands, $26@$27; American Scotch, $19@$20; Bay View Scotch No. 1, $18; No. 2, $17; Chicago Scotch No. 1, $17; No. 2, $16; Emma Scotch, $19@$19.50; black band, Hubbard Scotch, $19; Haselton, $19; soft silvery, $18; Wellston No. 1, $19; No. 2, $18.50@$19; Hamilton No. 1, $19.25@$19.75; Norton No. 1, $17.75@$18.25; Zanesville No. 1, $18.75@$19.25.

Structural Iron.—The demand for all structural irons continues heavy; some large contracts have been placed lately; mills are rushing work as fast as possible. Prices are very firm. We continue to quote: For car lots, f. o. b. Chicago, iron and steel angles, $2.35@$2.40; Universal plates, $2.55; sheared plates, $2.50; tees, $2.75@$2.85; beams and channels, $3.20. Store prices are: Angles, $2.50@$2.60; tees, $2.80@$2.90, and beams and channels, $3.50.

Bar Iron.—Inquiry and demand are well sustained and prices are held firmly. Mills are not booking as much tonnage as they have been shipping, still they are well filled with orders. Local mills are still quoting $1.90 for half extras. Valley mills ask $1.75 at mill. Here $1.80 is the ruling price for car iron. Store trade is good, and dealers quote $2.10@$2.20, with extras, according to quality and quantity.

Black Sheet Iron.—It is reported difficult to place orders for black sheets for the lighter gauges and standard sizes, as mills are very busy. It is impossible to obtain prompt delivery on new orders. No. 27 f. o. b. mill is now firmly quoted $3.05@$3.10 for car lots, the freight on which is 15 cents. At stores small lots are sold at $3.20 for No. 24, $3.30 for Nos. 25 and 26, $3.40 for No. 27. Smooth sheets at stores maintain the schedule of 60c. per cwt.

Galvanized Sheet Iron.—A large demand, firmness of quotations, and mills overcrowded with work are prominent features of this market. A positive famine is reported at warehouses for regular weights; there is an unusual amount of business in this direction at this season. Discounts for both cheap and standard brands are still 62½ per cent. on Juniata and 62½ and 5 per cent. on charcoal from stores.

Merchant Steel continues in good demand; so also does crucible and tool steels. A number of large contracts for implement steels have been placed of late at good rates, and orders continue to come in freely. Full prices are demanded. We quote as follows: Tool steel, $7.75@$8; specials, $12@$25; open-hearth machinery, $3; Bessemer machinery, $2.50@$2.70; open-hearth spring steel, $2.75@$2.80; tire, $2.50@$2.60; toe calk, $2.70@$2.80; sleigh shoe, $2.40@$2.50; cutter shoe (T. & B.), $2.65@$2.70; crucible sheet steel, $7@$10; crucible spring, $3.75.

Plates, Tubes, etc.—This market is without special change, with a good demand and firmness of quotations. Prices are: tank iron, $2.70; tank steel, $2.90; heavy sheets from 10 to 14, $2.90@ $3; steel sheets 10 to 14, $3.25@$3.50; shell iron, $3@ $3.25; flange iron, $4@$4.25; flange steel, $3.50; shell steel, $3.25; boiler rivets, $4@$4.25; fire box iron and steel, $4.75@$5.50; boiler tubes, 4½ inches and larger, 52½ per cent.; 2 to 4 inches, 50 per cent., and 1¾ inches and smaller, 45 per cent.

Nails.—A good inquiry is reported at stores for steel cut nails, for which $2@$2.05 is quoted. Wire nails are also in active demand at stores at $2.60@$2.65 per keg. Cut nails in large lots are in less demand at mills by jobbers and large dealers. They are quoted at about $1.80 at factory.

Steel Rails.—The feeling in the Chicago market is one of firmness. Small lots of standard sections are selling at $34 f. o. b. Chicago. Several large orders are reported pending which may result in advancing prices. There is an excellent demand for light sections, said to be unprecedented at this center.

Railway Track Supplies.—The demand is good for materials of all kinds. Prices firm. We quote iron fish plates $2.05@$2.10; steel fish plates $2.20@$2.25; bolts, square nuts, $3.00; hexagon nuts $3.10@3.15, according to quantity; spikes $2.20@$2.25.

Scrap Iron.—Track scrap and the cheaper grades are improving; the outlook is reported good. We quote as follows: Country mixed scrap, $15.50@$16.50, according to condition; No. 1 mill, $14@$14.50; light wrought, $9@ $9.50; horseshoes, $19@$19.50; axles, $26; cast machinery, $13@$14; stove plates, $9.50@$10; borings, $9.50@$10; wrought turnings, $13.50; No. 1 railroad shop or forge, $21.50; track scrap, $19.50@ $20.

Old Wheels and Rails.—Fair sales are noted with a steady demand and unchanged prices. Old iron rails are said to be scarce; very few are being offered. We quote: $27 for old iron rails f.o.b. Chicago; old steel rails, $19.50@$22.50, according to length, condition, etc.; guards and frogs, $18.50 @$19; old car wheels, $19.50@$20.

Cleveland. Oct. 2.

(From our Special Correspondent.)

There is nothing new of special interest to report in the iron ore market. No large sales for the past week have come to light, though a number of

sales of medium sized lots have been made in various sections; the principal inquiry, though, coming from consumers east of the Alleghenys. It would, perhaps, be quite difficult to find a round lot of high grade "non-Bessemer" ore of any one kind in this market, the mines now being pretty well sold up on this year's output. There is practically nothing doing in "Bessemers," business being confined almost exclusively to the "non Bessemers."

There is not enough activity in lake freights to make quotable rates, though they are nominal at $1.05 from Ashland, $1.00 from Marquette, and 85 cents from Escanaba. Many of the smaller vessels will soon seek winter quarters.

Quotations remain substantially as follows:

Specular and Magnetic Ores.

	Bessemer, 63@69 per cent		$6.50@$7.25
	" 60@64 "		5.00@ 6.00
Non	" 66@69 "		6.00
"	" 62@65 "		4.75@ 5.25
"	" 57@60 "		4.00@ 4.65

Soft Hematites Dried at 212°.

	Bessemer, 62@65 per cent		5.25@ 6.00
	" 58@61 "		4.50@ 5.00
Non	" 55@63 "		3.50@ 4.50

Above prices are for deliveries on docks at Lake Erie ports.

Louisville. Sept. 30.

[Special Report by Hall Bros. & Co.]

The general character of the market is featured with improvement. Reports from almost all directions are encouraging. Stocks in almost all districts have decreased materially. Consumption is increasing at a rapid rate. Furnaces are well booked for some months ahead, and many are unable to keep up with deliveries of certain grades; besides rolling stock seems insufficient to supply furnaces with prompt transportation. Inquiries keep up at a healthy degree, and some fair sized orders have been entered for mill and silvery irons. Foundry irons are scarce. It looks as if the market would take an upward move quite soon. If it should it will cause considerable buying, and many consumers will no doubt be surprised to learn how little available iron can be had for early shipment. If this should be the status of the market we would not be surprised to see prices go up considerably. Many furnaces are having a great deal of difficulty getting sufficient supply of fuel, etc. Copper, tin, steel, bar iron, nails, etc., all kinds of finished material, are strong. Scarcity of old rails, old wheels, etc., all of which increases the demand for pig iron. The English market is quite strong at a sharp advance, all of which tends to stimulate and points an early improvement in the market, though we quote strong as last, viz.:

Hot Blast Foundry Irons.—Southern coke, No. 1, $15@$15.25; No. 2, $14.25@$14.50; No. 3, $14@$14.25. Mahoning Valley, lake ore mixture, $17.75@$18.75; Southern charcoal, No. 1, $17@$17.50; No. 2, $16.50@$17. Missouri charcoal, No. 1, $18@$18.50; No. 2, $17@$17.50.

Forge Irons.—Neutral coke, $13.75@$14; cold short, $13.75@$14; mottled, $12.75@$13.25.

Car Wheel and Malleable Irons.—Southern standard brands, $22@$23; other brands, $18@$19. Lake Superior, $22.50@$23.

Philadelphia. Oct. 3.

(From our Special Correspondent.)

Pig Iron.—The fact that mill men and founders are very slow to close arrangements for future supplies of iron is construed by the small fry as indication of a decline in prices. Furnace people and brokers all talk the other way, but buyers place no confidence in predictions that winter iron will command more money. The fact that all three kinds have sold at as much as 50 cents below bottom quotations signifies nothing, as poor iron is and has been difficult to work off at any price. As for special brands, those who use them regularly keep well supplied, so that all makers of such brands are oversold and likely to remain so indefinately. Bessemer is quiet at $18.50 at furnace forge, $15@$15.50; delivered No. 2, $16.50@$17, and No. 1, $17.75@$18.50.

Foreign Material.—As long as bottom quotations for 20 per cent. spiegel are $31, there will be very little business. Ferro-manganese is selling in a small way at $68.50.

Steel Billets and Slabs.—Buyers claim a drop is imminent. There are several offers in hand for billets at $31. Nail slabs are moving at $31. A heavy demand is likely to set in as soon as buyers are satisfied with prices.

Muck Bars.—Mills have been kept unusually busy since September 1st. Buyers have been paying 50 cents to $1 more than they thought they ought to pay. Several offers are in hand to-day at $29.50 at mill.

Merchant Bars.—Stores have plenty of business at 2c. It is easier to ask 1·90c. at mill than to get it from large buyers. Considerable iron has been contracted for this week at 1·80c. Western mills have been grasping after Eastern trade.

Merchant Steel.—Prices are firmer and the demand has been quite brisk for a week.

Skelp.—Prices have been advanced for early deliveries, and as high as 2·10 has been paid for grooved, but large buyers, of whom there are several in the market, will not pay within a tenth at least of asking prices.

Wrought Iron Pipe.—The usual great activity prevails at outside prices.

Sheet Iron.—Outside prices are readily paid for deliveries that are assured at early and definite dates.

Plate and Tank Iron.—The plate mills have an elastic capacity. Three or four concerns, it was quietly intimated to-day, are actually shading prices for large orders for late delivery. Ship plates, tank and bridge plates are 2·25 for iron and 2·40@2.50 for steel.

Structural Iron.—The output is still maintained at maximum limits. Angles, 2·20; plates, 2·40; tees, 2·70; beams and channels, 3·10.

Steel Rails.—Most business is made up of small orders, and the usual quotation is $31 at mill.

Old Rails.—Interior buyers have been greatly disappointed this fall in getting rails, and are slow to place orders, when it is intimated that $26.50 here would secure a few lots.

Scrap.—There is a fair supply of No. 1 at $21@$21.50.

Pittsburg. Oct. 2.

(From our Special Correspondent.)

Raw Iron and Steel.—The market since our last could not be termed an active one; buyers, for reasons no doubt satisfactory to themselves, have held off or else purchased very sparingly, prices for most descriptions being weaker, with concessions made in some instances. The characteristic features of the market this week have been its irregularity. Under the stimulus of an extraordinary demand, finished material of every description shows increasing firmness in price, while crude iron is correspondingly depressed by the enormous output of this product.

The weakness in pig iron which was noted last week is still manifest, and it is made more marked by the upward tendency of rolled iron. Manufacturers, who follow closely the course of the trade, declare their inability to account for the present condition of the market. It has been repeatedly asserted that the output of all the blast furnaces is being taken at once, and that there is no accumulated stocks either at the rolling mills or at the furnaces. The enormous consumption of pig iron by the bar, plate and structural shape mills is quite apparent, but the continued weakness of the pig-iron market is sufficient evidence that the production of crude material is a little more than the requirements of consumption.

The danger of accumulating unsold stocks seems to loom up vividly before the furnace men, and a desire to market their product without delay appears to be the cause of the present weakness in prices. The Eastern market holds its own very fairly, the demand being well up to the supply, so that prices are steady and unchanged. Some well-informed parties think that things are shaping for better prices, but the general idea is that if present rates can be maintained it is all that can be expected.

A large number of puddling furnaces are in course of erection in the Mahoning Valley. The Youngstown Iron and Steel Company are erecting seven furnaces at their Warren rolling mill; Coleman, Shields & Co. are building two and the Falcon Iron and Nail Company are building nine. Cartwright, McCurdy & Co. have contracted for ten double puddling furnaces, and may erect more, together with a new three-high muck train.

The above furnaces will consume 90 tons daily of grey forge pig iron. These new furnaces are being built to make iron to take the place of old rails, of which the valley has been a large consumer. Scarcity of old rails is the cause of these new additions. All of the production will be consumed at the valley mills.

The situation: Bessemer pig, weak, lower; grey forge, prices maintained; muck bar, firm, higher; steel slabs and billets, not so firm; old iron rails, not so much fancied; scrap material holds its own in regard to values; spiegel, weaker. The sales tell the story.

Coke Smelted Lake and Native Ores.

2,000 Tons Bessemer	18.00 cash.
2,000 Tons Grey Forge	15.10 cash.
2,000 Tons Bessemer	18.25 cash.
1,500 Tons Off Bessemer, Oct., Nov	17.50 cash.
1,000 Tons Grey Forge, Oct. to Jan	15.00 cash.
1,000 Tons Off Bessemer	17.25 cash.
1,000 Tons Grey Forge	15.25 cash.
600 Tons No. 1 Foundry	17.00 cash.
500 Tons Grey Forge, Oct	15.20 cash
500 Tons Grey Forge, Oct	15.10 cash.
500 Tons Grey Forge, Oct	15.10 cash.
400 Tons No. 2 Foundry	16.00 cash.
200 Tons No. 3 Foundry	15.75 cash.
200 Tons Off Bessemer, Spot	17.50 cash.
100 Tons No. 1 Foundry	17.25 cash.
Muck Bar.	
2,000 Tons Neutral, Dec., Jan., Feb	30.25 cash.
2,000 Tons Neutral	30.00 cash.
1,500 Tons Neutral, Nov., Dec	30 00 cash.
1,500 Tons Neutral	31.00 cash.
Steel Slabs and Billets.	
2,000 Tons Billets, Dec, Jan	29.75 cash.
1,500 Tons Billets, Oct., Nov	30.00 cash.
1,000 Tons Billets, Extra	31.00 cash.
500 Tons Billets, Oct	30.25 cash.
Bloom Ends.	
1,000 Tons Bloom Ends, Spot	22.00 cash.
Skelp Iron.	
500 Tons Wide Grooved	1.95 4 mo.
350 Tons Sheared Iron	2.25 4 mo.
200 Tons Narrow Grooved	1.87½ 4 mo.
Steel Wire Rods.	
500 Tons American Fives	41.75 cash.
Ferro-Manganese.	
50 Tons 80 per cent., Pittsburg	72.50 cash.
Old Iron Rails.	
1,250 Tons American T's	28.00 cash.
1,000 Tons American T's	27.65 cash.
Scrap Material.	
250 Tons No. 1 Wrought Scrap	net 22.60 cash.
150 Tons No. 1 Wrought Scrap	net 22.50 cash.
150 Tons Iron Axles, Extra	net 32 00 cash.
100 Tons Iron Axles, Extra	net 32.75 cash.
100 Tons Leaf Steel	net 22.80 cash.
100 Tons Cast Borings	gross 12.75 cash.
50 Tons No. 2 Cast Scrap	gross 14.50 cash.

CHEMICALS AND MINERALS.

New York, Friday Evening, Oct. 3.

Heavy Chemicals.—The market for heavy chemicals is generally firmer. The Chemical Union has fixed prices for the remainder of this year and for next, and it is rumored that higher prices will rule after January 1st, 1891.

Caustic Soda.—Quotations for the various brands are as follows: 60 per cent., 3¾@$3·40c.; 74-76 per cent., 3·25@3¾c.; 77 per cent., 3·25c. Stocks continue light, and the market is very firm.

Carbonated Soda Ash.—For 48 per cent. quotations are 1·52½@1 60c., and for 58 per cent. 1·47½@1·52½c. The spot supply is limited, and the tone of the market is firm.

Caustic Soda Ash.—For prompt delivery this article is scarce. Quotations remain 1·45@1·50c.

Bleaching Powder.—Bleach is firmer than it has been for some time, with prices ruling 1·57½@1 60c., according to brand. There has been a good demand for this article, both for immediate and for future delivery.

Sal Soda.—For goods on the spot 1·20@1·25c. has been quoted, and for future shipments, 1·10@1·15c.

Acid.—Business in this market continues pretty much as has been reported in this column for some months past. That the Knickerbocker Chemical Company has changed its *modus operandi* is pretty well understood, but we do not see that this knowledge has been the cause of any excitement in the acid market. The market had been reported as being unsettled owing to the combination's change of policy, but we have been unable to verify this. It was hinted that higher prices would prevail in consequence of the change, but this also appears improbable. The following continue to be the ruling quotations: Acid, per 100 pounds in New York and vicinity: Acetic, $1.72½@$2.20; muriatic, 18-degree, 80c@$1.20; muriatic, 20-degree, 90c.@$1.50; muriatic, 22-degree, 90c.@$1.75; nitric, 36-degree, $2.75@$3.25; nitric, 40-degree, $3.25@$4.50; nitric, 42-degree, $3.75@$4.75; sulphuric, 60-degree, 70@80c., and sulphuric, 66-degree, 80c.@95c.

Fertilizing Chemicals.—Business in this market is improving. Stocks are not as large as they were a month ago, and a slow easy movement is going on. The production of raw materials this year has been somewhat greater than for 1889, in consequence of which prices have been reduced slightly. Quotations are as herewith given: High grade dried blood, $1.80@$1.85. For the low grade the price is $1.70@$1.75. Azotine, $1.85@$1.90. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $19@$20 per ton, and low grade 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.25@$18.75. Fish scrap, $20@$20.50 per ton f. o. b. factory. Sulphate of ammonia, prime gas liquor, $3.25; prime bone liquor, $3.12½. Concentrated tankage, $1.67½@$1.70. Refuse, bone black, guaranteed 70 per cent. phosphate, $17.50@$18 per ton. Dissolved bone black is nominally 25c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $6 per ton; kiln-dried, $7 per ton, f. o. b. vessels and cars, $6.50@$7.25. Freights by sail from Charleston to New York, $2.75@$3.50 per ton. Charleston rock, ground, $11.75@$12.25, ex-vessel at New York.

Nitrate of Soda.—There is a strong spot demand, and arrivals for the next 60 days will be light. This has been the cause of a stiffening in prices. Quotations are for spot goods, $1.80, and for November shipments, $1.75.

We are indebted to Mr. F. B. Nichols for the following interesting statistics issued under date of the 1st inst.:

	1890.	1889.	1888.
Stocks in store and afloat in Atlantic ports, Sept. 15, bags	46,688	62,808	93,306
Arrivals	58,521	18,462	nil.
	105,209	81,270	93,306
Previously reported, 483,247; total arrivals to date, 541,768; same time '89 377,032; same time '88, 383,167.			
Stocks	68,754	57,858	85,868
To arrive, 319,000; visible supply, 387,754; same time '89, 316,853; same time '88, 313,368.			
Stocks with dealers in store and afloat here:			
Deliveries fortnight ending Oct. 1	36,455	23,412	7,438
Previously reported	488,285	381,762	332,931
Total deliveries to Oct. 1	524,740	405,174	340,369
Sales spot	1·70@1·75	1·82@1·90	2·10@2·17

"During the month under review two cargoes on our list to arrive up to November-December

shipment were sold in London at prices considerably above our markets. There are other vessels for late sailing with European option that may be diverted by the higher rates of freight offered for Europe. The Valparaiso market has hardened under the influence of the movement to combine the producers in a common interest. A meeting in Iquique on the 30th ultimo resulted in the election of a committee on apportionment, which is a step toward confederation. At last the London committee of nitrate producers have appropriated a sum of money for a propaganda, and an excellent essay is being circulated, which, if pushed to the largest comprehension of the field, will have astounding results in this country. The arrivals in the month were: 'Stella' and 'Annie Reed,' at Baltimore; 'Stadacona' and 'Furness Abbey,' at Philadelphia, and 'Selkirk,' 'Oscar,' and 'Centennial' at this port."

Sulphate of potash 48 to 52 per cent. is quoted at $1.12½ per 100 pounds; manure salts, high grade, basis 90 per cent., $2.37½ per 100 pounds.

Kainit.—Nothing of importance is doing in kainit, for which quotations are $9.75@$10.

Muriate of Potash.—Arrivals at various ports aggregated some 350 tons during the week. There is a fair jobbing demand, and prices remain as last quoted, $1.77½@$1.82½.

Brimstone.—A scarcity of vessels, as well as higher freights in Sicily, have caused an advance in the price of brimstone. Not much actual trading was done during the week, and the spot supply is light. Quotations are: For best unmixed seconds, on the spot, $25, and no thirds are offered. For shpments near by, $24, and for far off, $23.

Liverpool. Sept. 24.

[Special Report by Messrs J. P. Bruner & Co.]

Most lines of heavy chemicals continue in good request, but manufacturers being so well sold, buyers find it difficult to place any fresh business.

Soda ash has advanced and manufacturers are mostly cleared out for prompt delivery and have little to sell for the balance of this year. Nearest values to day are: Caustic ash, 1⅞@1½d.; carbonated ash, 1⅜@1½d., according to brands.

Soda crystals firm at £3 5s.@£3 8s. 6d. per ton, and tendency is to higher prices.

Caustic soda still advancing, owing to scarcity. Manufacturers have little to sell for October, and nearest values are: 60 per cent., £10 10s.@£10 15s.; 70 per cent., £11 10s.@£11 15s.; 74 per cent., £12 10s.; 76 per cent., £13. For November and December delivery business has been in 70 per cent. at £10 12s. 6d.@£10 15s., and orders at the lower figure are now refused.

Bleaching powder shows little change, £5 15s.@£6 being nearest spot values, but there is little offering.

Chlorate of potash is quoted at 5@5½d. per pound.

Bicarb. soda has advanced, £6 10s. being now lowest price for one cwt. kegs, with usual allowances for larger packages. There is nothing offering for prompt delivery.

Sulphate of ammonia rather easier at £11 15s.@£11 17s. 6d. per ton for good gray, 24 per cent. in double bags f.o.b. here, and a shade less would probably be accepted for October delivery.

With regard to the Chemical Union this scheme is said to be progressing favorably, and it is now understood that the capital has been fixed at 8½ millions. Manufacturers state that, if necessary, the Union will be floated without the aid of the outside public, and the prospectus is expected to be out this month.

(From Geo. G. Blackwell's Report.

Minerals.—Our market has ruled very steady during the week, and practically there is no change to report in prices. Manganese: Arrivals have been rather under the average, and prices have ruled steady, both for prompt and forward delivery. Magnesite: There is no reduction in stocks, and no alteration to report in prices, which are in favor of buyers; raw lump, 30@40s.; raw ground, £6 10s., and calcined ground £11. Bauxite (Irish Hill brand): The production is notable to keep pace with the demand, and prices, therefore, have improved; lump, 22s.; seconds, 18s.; thirds, 14s.; ground, 35s. French chalk has ruled very steady during the week. There have been more arrivals, but most having gone into consumption prices are unaltered, especially for G. G. B. "Angel White" brand; 97s. 6d. to 105s. medium, 110s. to 120s. superfine. Barytes: Both carbonate and sulphate are in fair demand, without any alteration to report in prices. Pumicestone unaltered; ground at £10, and specially selected lump, finest quality, £13. Iron ore easier: Bilbao and Santander 9s.@10s. 6d. f.o.b.; Irish, 11s.@12s. 6d.; Cumberland, 9s.@10s. 6d. Purple ore quiet. Spanish manganiferous ore in fair demand. Emerystone unchanged. No. 1 lump £5 10s.@£6, and smalls £5@£5 10s. Fullers' earth: 45@50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal are in request at advanced prices. Chrome ore quiet; prices unchanged. Antimony ore and metal in demand at full figures. Asbestos in strong demand, especially rock, and prices very firm. Potter's lead ore of best and "standard" brands in request; smalls, £14@£15; selected lump, £16@£17. Calamine in good demand at 65@80s. Strontia sulphate (celestine) inquired for 16s. 6d.@17s. Carbonate (native), £15@£16; powdered (manufactured), £11@£12. Limespar, English manufactured, old G.G.B. brand in request at 50s. (ground). Felspar and fluorspar steady. Plumbago, Spanish, £6; best Ceylon lump at last quotations: Italian and Bohemian, £4@£12 per ton. "Founders," £5@£6; Blackwell's "Mineraline," £10. French sand, in cargoes, scarce on spot, 20@22s. 6d. Ground mica, £50. China clay, quiet; common, 18s. 6d; good medium, 22s. 6d.@25s.; best, 30s.@35s. (at Runcorn). Irish moss: more doing; best quality, £13@£14. Bog ore (oxide of iron), finest quality, 22s.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Oct. 3.

Brick.—At last the e are prospects of a speedy adjustment of troubles in this market. The walk-delegates have declared the boycott off. This victory for the manufacturers means another bad defeat for the Knights of Labor. Both sides have necessarily suffered pecuniarly, the building trade in this city and vicinity was considerably affected, a demoralized state of affairs was felt in the building material market, and so far as we can see no one has been benefited. It is deeply to be regretted that such things will happen. A little forbearance on one side and a less dictorial manner on the other would go toward averting such difficulties as that which has lately been experienced in this market. The change of aspect has occurred so recently that the reaction for the better has not had time to set in. Manufacturers are not making much brick just at present, and it is not desirable to ship all the brick at the yards now at once, inasmuch as a glut might result. It is difficult to obtain quotations indicative of the true state of the market, and in the absence of actual sales upon which to base our quotations we give them nominally: Haverstraws, $6.25@$7; Jerseys, $4.50@$5.50; Pales, $3.50@$4 per thousand.

Lime.—The arrivals during the week have been exceedingly light. The Maine kilns are producing only about one-half their full capacity, and there seems to be no inclination on the part of the manufacturers to increase their output. Despite the fact that the Knox County (Maine) Lime Association disbanded some months ago, manufacturers realize that it would be suicidal on their part to attempt to ship much lime at a time and to a market in which there is not much demand for lime. The ruinous competition that would necessarily ensue prevents lime burners from sending more lime to this market. Our quotations this week are: Rockland, common, $1 per barrel; finishing, $1.20; St. John, common and finishing, 90c.@$1; Glen Falls, common and finishing, 90c.@$1.10.

Cement.—There is a fairly good demand for the various brands of cement. Quotations remain as last quoted: Rosendale, 90c.@$1; Portland, American, $2.15@$2.45; foreign, $2.40@$2.50; special brands, $2.60@$2.85; Roman, $2.75@$2.95; Keene's coarse, $4.50@$5.50; Keene's fine, $7.25@$8.50 per barrel.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM SEPTEMBER 20 TO SEPTEMBER 27 AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co....	....	322
Hendricks Bros....	....	50
La Marche's Sons, H....	....	5
Lewisohn Bros....	....	150
Meyer, G. A. & E..	....	9
Milne & Co....	....	74
Muller, Schall & Co....	....	123
Total....	....	733
Corres. date, 1889..	....	685

Pig Lead.	Lbs.	Lbs.
Amer. Metal Co....	15	15
Bruce & Cook....	....	25
Caswell, E. A....	....	211
Hendricks Bros....	....	100
Naylor & Co....	....	10
Schulz & Co., A..	....	98
G. W. Sheldon....	....	149
Total....	15	608
Corres. date, 1889..	....	251

Tin.	Tons.	Tons.
Abbot, Jere, & Co.		125
Amer. Metal Co....	....	2,125
Bidwell & French.	....	1,015
Bruce & Cook....	....	10
Carter, Hawley & Co		80
Cohen & Co., A....	....	10
Cohen, H....	....	20
Cort & Co., N. L....	....	125
Crooks & Co., R..	....	85
Davol & Son....	5	39
Hendricks Bros....	....	42
Knauth & Kuhne..	....	10
Lehmaier, S., & Co.	10	132
Lewisohn Bros....	25	45
Merchant & Co		50
Muller, Schall & Co.	95	715
Naylor & Co....	....	1,336
Nissen, Geo	....	10
Phelps, Dodge & Co	100	2,896
Thomson, A. A. & Co....		50
Thomson, D. & Co.		70
Townsend, & Co., J. R....		50
Trotter & Co, N..	....	75
Total....	235	9,115
Corres. date, 1889..	....	7,876

Tin Plates.	Boxes.	Boxes.
Adams & Westl'ke Co....		70
Bruce & Cook....	6,123	103,948
Byrne & Son....	....	1,000
Central Stamp. Co.		53,141
Coddington & Co...	8,047	120,420
Cohn & Co	125	14,612
Con. Fruit Jar Co.		120
Cornere F. & Co...	195	7,902
Cort & Co	8,630	167,758
Crooks & Co....	2,185	75,736
De Milt & Co, H. R.	501	8,898
Dickerson, V. D. & Co	9,942	302,414
Fenton, D. E....	....	3,890
Haberman, F....	....	66
Herring, Chas. E....	....	1,000
Iron Clad Mfg. Co.	108	597
Lalance & G. M. Co.		9,010
Lazard Bros....	....	1,048
Lehmaier, Schw'z & Co....		200
Merchant & Co....	1,312	23,634
Mersick & Co.. ..	....	10,008
Morewood & Co...	1,000	40,739
Newell Bros....	....	416
Payne, S. H. & Co.		934
Pratt Mfg. Co....	....	95,271
Phelps, Dodge & Co	14,994	633,704
Schneider & Co., J.		3,365
Shepard & Co....	....	13,021
Standard Oil Co. ..	....	7,906
Taylor, N. & G....	....	1,229
Thomson & Co., A.A.	3,935	88,144
Warren, J. M....	....	4,868
Wheeler & Co....	733	26,560
Whittemore & Co.		14,016
Wolff & Reesing...	....	2,077
Wright, Peter & Co.		227
Total....	58,230	1,838,019
Corres. date, 1889..	24,428	1,747,311

Pig Iron.	Tons.	Tons.
Abbott & Co., Jere.		250
Baldwin & Co., A..		807
Baldwin Bros. & Co....		170
Crocker Bros....		1,515
Crooks & Co., R....		5
Dana & Co..		150
Drummond & Co		400
Geisenheimer & Co		76
Hagermeyer & Brun		30
Henderson Bros.		100
Irvin. R. I. & Co		400
Lillienberg, N....		2,409
Naylor & Co....		150
Perry & Reyer....		53
Pierson & Co		30
Sheldon, G. W. & Co.		200
Stetsson & Co., G. W....		2,425
Williamson, J. & Co.	50	1,700
Total....	50	10,870
Corres. date, 1889...	400	24,697

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Abbott & Co....		233
Baldwin Bros. & Co....		2
Dana & Co...		1,670
Dolge & Co., A....		1
Downing, R. F. & Co.		109
Henderson Bros....		1
Holt & Co., H. N....		4
Martin & Co		80
Milne, A., & Co..		225
Naylor & Co....	602	1,396
Pope, Jas. E., Jr.		61
Richards & Co., C. B.		1
Roebling's Sons, J. A....		2,074
Wolff, & Co., R. H.		60
Total....	602	5,917
Corres. date, 1889..		23,199

Bar Iron.	Tons.	Tons.
Abbott & Co., Jere.		796
Bacon & Co....		1,155
Crocker Bros....		77
Dickerson, Van Dusen & Co....		6
Downing & Co....		285
E. J. Jacobus.		104
Fuller, Dana & Fitz.		11
Holt, H. N.... ..	50	230
Lillienberg, N....	21	468
Lundberg, G....	109	2,411
Milne & Co....	57	1,189
Muller, Schall & Co.		289
Naylor & Co....		604
Page, Newell & Co.		1,855
Plenty, J		14
Wilson, J. G....		3
Total....	237	9,497
Corres. date, 1889..		8,909

Scrap Iron.	Tons.	Tons.
Baldwin Bros. & Co....		7
Crossman & Co., W. H....		30
Frankfort, M....	115	347
Leary, D....	27	27
McDougall & Potter....		92
Muller, Schall & Co.		18
Pierson, C. L....		101
Samper & Co., S.		186
Stevens, Corvin & Co....		30
Ward, J. E. & Co..		737
Total....	142	1,575
Corres. date, 1889...		2,866

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co....	298	8,717
American S. Co....		765
Bacon & Co....		469
Bunnell & Co., J. H.		50
Carey & Moen....	10	476
Cooper, Hewitt & Co....		371
Dana & Co.	393	1,196
Dodge & Co., A..		3
Downing & Co....		129
Galpin, S. A....		1,206
Greely & Co, E. S.		35
Hazard Mfg. Co ..	30	451
Holt & Co., H. N....		3
Jacobus, E. Y....		2
Lee, James & Co...		1,682
Lillienberg, N.		300
Lundberg, G....		126
Lundell, C. G		5
Milne & Co....	102	1,548
Muller, Schall & Co.	50	850
Naylor & Co....	190	5,747
Page, Newell & Co.		1,229
Roebling's Sons, J. A....		2,437
Schulze & R....		1
Taylor, N. L....		16
Temple & Lockw'd		6
Wessel & Co....		21
Wiebusch & Ho....		4
Wood & Niebuhr..		25
Wolf & Co., R. H..	110	3,232
Total....	1,183	31,102
Corres. date, 1889...	255	36,192

Old Rails.	Tons.	Tons.
Bowring & Archibald....		340
Dana & Co....		764
Frankfort, M....	957	7,515
Henderson Bros...		300
Hernsheim, L		350
Mosle Bros....		123
Naylor & Co....	256	2,224
Sawyer, Wallace & Co....		610
West, H....	398	398
Wiechers, J. F....		150
Total....	1,611	12,774
Corres. date, 1889...		10,127

Spiegeleisen.	Tons.	Tons.
Abbott, Jere & Co.		2,725
American Metal Co....		100
Blakely & McLellan....		1,684
Crocker Bros.... ..	968	21,646
Crooks & Co. R.		106
Dana & Co	25	15,025
Foley, F....		50
Geisenheimer & Co.		728
Henderson Bros. & Co....		14
Hernsheim. L....		18,452
Holt, H. N..		200
Ivin & Co., R. I....		50
Naylor & Co....	597	10,648
Perkins, C. L....		1,452
Sachs & Richmond.		2
Whittemore, H. & Co.		55
Total....	1,590	73,337
Corres. date, 1889...	3,496	63,139

Iron Ore.	Tons.	Tons.
Baiz, Jacob....		67
Bergen Point Chemical Co...	2,000	2,000
Bowring & Archibald....		5,292
Earnshaw, A....		3,517
Ennis, Andrew		138
Flores & Co., R. de		14,143
Johnson & Co., L..		5,030
Total....	2,000	30,487
Corres. date, 1889..		8,860

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere.		2,545,103
Amer. Met. Co., L..		940,3.5
Barber & Co		13,750
Belmont, Aug. & Co		1,768,97-
Boker, C. F....		117,000
Burgass & Co....		227,200
French, Edye & Co....		135,374
Heidelbech, Sicheimer & Co		672,608
Lewisohn Bros....	113,352	2.6,590
Muller, Schall & Co....		16,250
Sawyer, W'l'ce & Co....		22,796
Seamen, S. H....		66,950
Ward, J. E. & Co.		100,000
Wiechers, J. F		29,977
Wil'ms & Thune.		112,004
Total....	113,352	5,965,051
Corre. date, 1889.	528,610	7,946,061

Copper Matte.	
American Metal Co	3,072,079
Lewisohn Bros...	1,870,814 3,9-7,179
Nichols, Geo. H....	267,202
Paulsen, Wm....	1,039,428
Wil'ms & Thune..	2,848,706
Total	1,870,814 11,164,594
Corres. date 1889...	248,618 24,581,927

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and Amount of last			Dividends. Total paid.	Date & amount of last.	
1	Adams, s. L.	Colo..	$1,500,000	150,000	$10	*	.....	.....	.....	$555,000	Jan.. 1887	.10
2	Alice, s. C.	Mont.	10,000,000	400,000	25	*	.....	.....	.....	850,000	July. 1890	.06½
3	Alma&Nel Wood C.,G	Idaho	300,000	30,000	10	*	.....	.....	.....	60,000	Jan.. 1889	.50
4	American & Nettie,c.	Colo..	.....	300,000	.....	.....	.....	.....	.....	150,000	Nov.. 1889	.10
5	Amy & Silversmith,s.	Mont.	.....	341,419	.....	.....	.....	.....	.....	247,530	Aug.. 1887	.12½
6	Atlantic, c.	Mich..	1,000,000	40,000	25	$280,000	April	1875	$1.00	660,000	Aug.. 1890	1.00
7	Argenta, s.	Nev..	10,000,000	100,000	100	325,000	July.	1889	.10	40,000	Feb.. 1890	.20
8	Aspen Mg. & S., s. L.	Colo..	2,000,000	200,000	10	*	.....	.....	.....	500,000	Sept. 1890	.10
9	Aurora, L.	Mich..	2,000,000	100,000	20	.....	.....	.....	.....	155,000	Oct.. 1887	1.87½
10	Badger, s.	Ont..	250,000	50,000	5	.....	.....	.....	.....	37,500	Mar.. 1890	.25
11	Bassick, G. S.	Colo..	10,000,000	100,000	100	*	.....	.....	.....	400,000	Mar.. 1884	1.00
12	Belle Isle, s.	Nev..	10,000,000	100,000	100	190,000	Dec..	1889	.15	300,000	Dec.. 1879	.25
13	Belcher, G. S.	Nev..	10,400,000	104,000	100	2,978,000	June	1890	.50	15,397,000	April	1876 1.00
14	Bellevue, Idaho, s. L.	Idaho	1,250,000	125,000	10	120,000	Dec..	1889	.25	200,000	Jan.. 1887	.10
15	Bi-Metallic, s.	Mont.	5,000,000	200,000	25	.....	.....	.....	.....	150,000	Sept. 1890	.25
16	Bodie Con., G. S.	Cal..	10,000,000	100,000	100	575,000	Nov..	1889	.25	1,602,572	April	1885 .50
17	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*	.....	.....	.....	520,000	June	1886 1.15
18	Boston & Mont., c. s.	Mont.	2,500,000	100,000	25	*	.....	.....	.....	1,450,000	Aug.. 1890	.50
19	Breece, s.	Colo..	5,000,000	200,000	25	*	.....	.....	.....	2,000	Feb.. 1890	.01
20	Brooklyn Lead, L. S.	Utah..	500,000	50,000	10	.....	.....	.....	.....	127,000	July. 1887	.05
21	Bulwer, G.	Cal..	10,000,000	100,000	10	130,000	Aug..	1889	.25	175,000	Jan.. 1884	.10
22	Bunker Hill & Sull.	Idaho	3,000,000	300,000	10	*	.....	.....	.....	150,000	Oct.. 1883	.06⅔
23	Caledonia, G.	Dak..	10,000,000	100,000	100	505,000	May	1885	.15	194,000	Oct.. 1890	.08
24	Calliope, s.	Colo..	1,000,000	1,000,000	.....	.....	.....	.....	.....	90,000	April	1890 .01
25	Calumet & Hecla, c.	Mich..	2,500,000	100,000	25	1,200,000	.....	.....	.....	34,350,000	May	1890 5.00
26	Carbonate Hill, s. L.	Colo..	1,500,000	300,000	10	*	.....	.....	.....	80,000	April	1884 .05
27	Carlisle, G. M.	N. M..	1,000,000	200,000	5	.....	.....	.....	.....	175,000	Dec.. 1888	.12½
28	Castle Creek, G.	Idaho	100,000	100,000	1	.....	.....	.....	.....	51,000	Oct.. 1883	.03
29	Cataipa, s. L.	Colo..	3,000,000	300,000	10	*	.....	.....	.....	270,000	May. 1884	.10
30	Central, c.	Mich..	500,000	20,000	25	100,000	Oct..	1861	.65	1,950,000	Feb.. 1890	1.00
31	Chrysolite, s. L.	Colo..	10,000,000	200,000	50	*	.....	.....	.....	1,650,000	Dec.. 1884	.25
32	Colorado Central,s.L.	Colo..	2,750,000	275,000	10	*	.....	.....	.....	406,250	Aug.. 1889	.05
33	Confidence, s. L.	Colo..	.....	24,360	.....	328,880	May	1890	.75	199,680	April	1889 1.00
34	Cons. Cal. & Va., G. S.	Nev..	21,600,000	216,000	100	108,000	Jan..	1885	.20	3,466,800	April	1890 .25
35	Contention, s.	Ariz..	12,500,000	250,000	50	.....	.....	.....	.....	12,587,500	Dec.. 1884	.25
36	**Cop. Queen Con.,	Ariz..	1,400,000	140,000	10	.....	.....	.....	.....	210,000	Feb.. 1889	.50
37	Crescent, s. L. G.	Utah..	15,000,000	600,000	25	*	.....	.....	.....	228,000	Oct.. 1888	.03
38	Crown Point, G. S.	Nev..	10,000,000	100,000	100	2,425,000	Sept.	1889	.50	11,388,000	Jan.. 1875	2.00
39	Daly, s. L.	Utah..	3,000,000	150,000	20	.....	.....	.....	.....	1,612,500	Aug.. 1890	.25
40	Deer Creek, s. G.	Idaho	1,000,000	200,000	5	*	.....	.....	.....	20,000	June	1889 .05
41	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*	.....	.....	.....	$1,000,000	Nov.. 1887	.10
42	Derbec B. Grav., G. S.	Cal..	10,000,000	100,000	100	90,000	Dec..	1881	.10	230,000	May. 1890	.10
43	Dunkin, s. L.	Colo..	5,000,000	200,000	25	*	.....	.....	.....	390,000	Oct.. 1889	.05
44	Dunstone, G. S. L.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	6,000	Nov.. 1888	.03
45	Eclipse, s.	Colo..	100,000	100,000	1	.....	.....	.....	.....	30,000	Nov.. 1887	.10
46	Elkhorn, G. S.	Mont.	1,000,000	100,000	10	50,000	July.	1883	.50	850,000	July. 1887	.05
47	Empire Lt., G.	Mont.	500,000	100,000	5	.....	.....	.....	.....	70,500	Oct.. 1887	.37½
48	Eureka Con., G. S. L.	Nev..	5,000,000	50,000	100	550,000	June	1889	.50	4,892,530	Oct.. 1890	.25
49	Evening Star, s. L.	Colo..	500,000	50,000	10	*	.....	.....	.....	1,458,000	Dec.. 1889	.25
50	Excelsior, G.	Cal..	10,000,000	100,000	100	563,000	Sept.	1885	1.00	875,000	Oct.. 1890	.25
51	Father de Smet, G.	Dak..	10,000,000	100,000	100	200,000	Nov..	1878	1.00	1,125,000	Dec.. 1885	.20
52	Franklin, c.	Mich..	1,000,000	40,000	25	220,000	June	1871	.....	960,000	Jan.. 1889	2.00
53	Freeland, G. S. C.	Colo..	5,000,000	200,000	25	*	.....	.....	.....	190,000	July. 1886	.10
54	Garfield Lt., G. S.	Nev..	500,000	100,000	5	.....	.....	.....	.....	95,000	April	1888 .12½
55	Gould & Curry, G. S.	Nev..	10,800,000	108,000	100	3,988,800	Sept.	1890	.25	2,836,000	Oct.. 1870	10.00
56	Grand Prize, s.	Nev..	10,000,000	100,000	100	785,000	Jan..	1850	.30	525,000	Jan.. 1890	.30
57	Granite, s. L.	Idaho	500,000	500,000	1	*	.....	.....	.....	26,000	Oct.. 1889	.02
58	Granite Mountain, s.	Mont.	10,000,000	400,000	25	.....	.....	.....	.....	9,200,000	July. 1890	.50
59	Green Mountain, G.	Cal..	1,250,000	125,000	10	*	.....	.....	.....	212,000	Nov.. 1881	.07½
60	Hale & Norcross, G. S.	Nev..	11,200,000	112,000	100	5,142,800	April	1890	.50	1,162,000	July. 1888	.50
61	Hecla Con., G. L. C.	Mont.	1,500,000	30,000	50	.....	.....	.....	.....	1,500,000	April	1889 .50
62	Hel'a Mg.& Red,G.S.L.	Mont.	3,315,000	663,000	5	*	.....	.....	.....	197,979	July. 1886	.06
63	Holmes, s.	Nev..	10,000,000	100,000	100	370,000	May.	1890	.25	75,000	April	1886 .25
64	Holyoke, c.	Idaho	200,000	200,000	1	.....	.....	.....	.....	27,000	Feb.. 1883	.10
65	Homestake, G.	Dak..	12,500,000	125,000	100	300,000	July	1878	1.00	5,581,250	Aug.. 1890	.10
66	Honorine, s. L.	Utah..	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept. 1887	.05
67	Hope, s.	Mont.	1,000,000	100,000	10	*	.....	.....	.....	233,252	April	1888 .25
68	Horn-Silver, s. L.	Utah..	10,000,000	400,000	25	*	.....	.....	.....	4,150,000	June	1890 .12½
69	Hubert, G.	Colo..	1,000,000	1,000,000	1	*	.....	.....	.....	247,000	Dec.. 1889	.00½
70	Idaho, G.	Cal..	310,000	3,100	100	.....	.....	.....	.....	5,235,900	Dec.. 1889	5.00
71	Ideal, s. L.	Colo..	1,500,000	50,000	10	.....	.....	.....	.....	15,000	Oct.. 1886	.05
72	Illinois, s.	N. M..	100,000	100,000	1	*	.....	.....	.....	45,000	April	1889 .20
73	Independence, s.	Nev..	10,000,000	100,000	100	340,000	Oct..	1886	.20	225,000	Sept. 1879	.25
74	Iron Hill, s.	Dak..	2,500,000	250,000	10	134,000	July.	1889	.05	156,250	Nov.. 1887	.07½
75	Iron-Silver, s. L.	Colo..	10,000,000	500,000	20	*	.....	.....	.....	2,500,000	April	1889 .20
76	Jackson, G. S.	Nev..	5,000,000	50,000	100	237,500	Nov..	1880	.20	55,000	June	1889 .10
77	Jay Gould.	Mont.	2,000,000	400,000	5	*	.....	.....	.....	459,000	May	1890 .04
78	Jocusitita, L.	Mex..	2,500,000	250,000	10	.....	.....	.....	.....	1,200,000	Feb.. 1885	.50
79	Jumbo, G.	Colo..	2,000,000	200,000	10	.....	.....	.....	.....	35,000	Oct.. 1887	.02½
80	Kearsarge, c.	Mich..	1,250,000	50,000	25	190,000	Oct..	1887	1.00	100,000	Jan.. 1890	2.00
81	Kentuck.	Nev..	3,000,000	30,000	10	406,930	Aug..	1890	.30	1,350,000	Dec.. 1886	.10
82	La Platta, s. L.	Colo..	2,000,000	200,000	10	.....	.....	.....	.....	610,000	Sept. 1892	.30
83	Leadville Con., s. L.	Colo..	4,000,000	400,000	10	*	.....	.....	.....	4,423,000	April	1889 .05
84	Lexington, G. S.	Mont.	4,000,000	40,000	100	*	.....	.....	.....	609,000	Jan.. 1885	2.00
85	Little Chief, s. L.	Colo..	10,000,000	200,000	50	*	.....	.....	.....	810,000	Jan.. 1890	.05
86	Little Pittsburg, s. L.	Colo..	20,000,000	200,000	100	*	.....	.....	.....	1,050,000	Mar.. 1890	.50
87	Little Rule.	Colo..	500,000	500,000	1	.....	.....	.....	.....	30,000	June	1890 .02
88	Mammoth.	Utah..	10,000,000	400,000	25	.....	.....	.....	.....	480,000	Aug.. 1890	.10
89	Martin White, s.	Nev..	10,000,000	100,000	100	1,300,000	Feb..	1890	.25	140,000	Dec.. 1886	.25
90	Mary Murphy, G. S.	Colo..	350,000	3,500	100	*	.....	.....	.....	175,000	May	1888 5.00
91	Matchless, s.	Colo..	500,000	500,000	1	*	.....	.....	.....	15,000	Feb.. 1890	.00½
92	May Mazeppa.	Colo..	1,000,000	100,000	1	.....	.....	.....	.....	30,000	Sept. 1890	.01
93	Minnesotta, c.	Mich..	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar.. 1876	.....
94	Mono, G.	Cal..	5,000,000	50,000	100	765,000	Sept.	1890	.25	12,500	Mar.. 1886	.25
95	Montana, Lt., G. S.	Mont.	3,000,000	600,000	5	*	.....	.....	.....	2,489,675	Oct.. 1890	.06
96	Morning Star, s. L.	Colo..	1,000,000	100,000	10	*	.....	.....	.....	850,000	Dec.. 1889	.20
97	Moulton, s. G.	Mont.	2,000,000	400,000	5	*	.....	.....	.....	380,000	Dec.. 1887	.07½
98	Mount Pleasant, G.	Cal..	150,000	150,000	1	*	.....	.....	.....	150,000	Feb.. 1887	.30
99	Mt. Diablo, s.	Nev..	5,000,000	50,000	100	137,500	June	1889	2.00	160,000	Oct.. 1889	.20
100	Napa, Q.	Cal..	700,000	100,000	7	.....	.....	.....	.....	370,000	July. 1889	.10
101	Navajo, G. S.	Nev..	10,000,000	100,000	100	500,000	April	1890	.15	365,000	April	1890 .10
102	New Guston, s.	Colo..	500,000	100,000	5	.....	.....	.....	.....	337,500	April	1890 .50
103	N. Hoover Hill, G. S.	N. C..	300,000	12,000	25‡	*	.....	.....	.....	30,000	Dec.. 1885	.06½
104	Northern Belle, s.	Nev..	5,000,000	50,000	100	425,000	Jan..	1884	8.00	2,400,000	April	1883 .50
105	North Belle Isle, s.	Nev..	10,000,000	100,000	100	395,000	April	1890	.30	230,000	May	1888 .50
106	North Star, G.	Cal..	1,000,000	100,000	10	.....	.....	.....	.....	250,000	Dec.. 1889	.50
107	Ontario, s. L.	Utah..	15,000,000	150,000	100	.....	.....	.....	.....	11,225,000	Aug.. 1890	.10
108	Ophir, G. S.	Nev..	10,000,000	100,000	100	4,210,640	April	1890	.50	1,535,800	July. 1882	1.00
109	Original, s. C.	Mont.	1,500,000	60,000	25	*	.....	.....	.....	123,000	July. 1888	.05
110	Oro.	Colo..	500,000	100,000	5	.....	.....	.....	.....	60,000	June	1890 .20
111	Osceola, c.	Mich..	1,250,000	50,000	25	480,000	April	1876	1.6	1,372,500	Sept. 1890	1.00
112	Oxford, G.	N. S..	125,000	125,000	1	*	.....	.....	.....	78,900	Sept. 1888	.02
113	Paradise Valley, G. S.	Nev..	10,000,000	100,000	100	57,000	April	1888	.15	150,000	April	1887 .10
114	Parrot, c.	Mont.	1,800,000	180,000	10	.....	.....	.....	.....	696,000	Sept. 1890	.10
115	Peacock, s. G. C.	N. M..	2,000,000	200,000	10	*	.....	.....	.....	60,000	Nov.. 1886	.....
116	Plumas Eureka, G.	Cal..	1,406,250	140,625	10	.....	.....	.....	.....	2,548,046	Oct.. 1889	.37½
117	Plutus, G. S. C. L.	Colo..	2,000,000	200,000	10	*	.....	.....	.....	20,000	Feb.. 1886	.10
118	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*	.....	.....	.....	2,280,000	Feb.. 1888	.40
119	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100	.....	.....	.....	.....	1,705,791	Aug.. 1890	1.50
120	" com., Q.	Cal..	5,000,000	57,000	100	.....	.....	.....	.....	645,957	July. 1882	.40
121	Quincy, c.	Mich..	1,000,000	40,000	25	200,000	Dec..	1862	.....	5,570,000	Aug.. 1890	5.00
122	Republic, c.	Mich..	5,000,000	100,000	50	400,000	Dec..	1889	.30	4,312,587	June	1887 1.25
123	Richmond, s. L.	Nev..	1,350,000	54,000	25	*	.....	.....	.....	99,785	Feb.. 1890	.50
124	Ridge, c.	Mich..	500,000	23,000	25	219,939	Mar..	1886	.50	585,000	Mar.. 1886	.05
125	Robinson Con., s. L.	Colo..	10,000,000	200,000	50	*	.....	.....	.....	10,000	Dec.. 1892	.50
126	Robert E. Lee, s. L.	Colo..	10,000,000	563,000	100	.....	.....	.....	.....	4,661,000	Jan.. 1889	3.00
127	Savage, s.	Nev..	11,200,000	112,000	100	6,604,000	Nov..	1889	.50	7,500	April	1883 .01
128	Shoshone, G.	Idaho	150,000	150,000	1	.....	.....	.....	.....	1,568,145	April	1888 .12½
129	Sierra Buttes, G.	Cal..	2,225,000	122,500	10	.....	.....	.....	.....	102,000	Jan.. 1871	1.00
130	Sierra Nevada, G. S.	Nev..	10,000,000	100,000	100	6,246,910	May	1890	.50	270,000	April	1889 .10
131	Sierra Nevada, s. L.	Idaho	1,000,000	1,000,000	1	*	.....	.....	.....	40,000	May	1889 .02
132	Silver Cord, G. S. L.	Nev..	4,500,000	450,000	10	.....	.....	.....	.....	270,000	April	1889 .10
133	Silver King, s.	Ariz..	10,000,000	100,000	100	130,000	Sept.	1890	.30	1,950,000	July. 1887	.25
134	Silver Mg. of L. V.	N. M..	500,000	500,000	1	.....	.....	.....	.....	225,000	Sept. 1890	.15
135	Silverton, G. S. L.	Colo..	2,000,000	200,000	10	*	.....	.....	.....	50,000	Jan.. 1881	.25
136	Small Hopes Con., s.	Colo..	5,000,000	250,000	20	*	.....	.....	.....	3,137,500	June	1889 .10
137	Spring Valley, G.	Cal..	200,000	200,000	1	50,000	Oct..	1886	.25	3,595,000	June	1888 .05
138	Standard, G. S.	Cal..	10,000,000	100,000	100	100,000	June	1890	.50	155,000	Nov.. 1891	.05
139	Stormont, s.	Utah..	500,000	500,000	1	*	.....	.....	.....	844,000	Dec.. 1887	.20
140	St. Joseph, L.	Mo..	1,500,000	150,000	10	*	.....	.....	.....	9,000	April	1888 .02½
141	Swansea, G.	Colo..	600,000	60,000	10	*	.....	.....	.....	100,000	Nov.. 1881	.20
142	Tamarack, c.	Mich..	1,000,000	40,000	25	520,000	April	1885	8.00	1,670,000	Oct.. 1890	4.00
143	Tombstone, G. S. L.	Ariz..	12,500,000	500,000	25	*	.....	.....	.....	1,250,000	April	1892 .10
144	United Verde, c.	Ariz..	3,000,000	300,000	10	*	.....	.....	.....	97,500	Feb.. 1894	.10
145	Valencia, M.	N. M..	150,000	1,500	100	*	.....	.....	.....	41,250	April	1886 2.50
146	Viola Lt., s.	Idaho	750,000	150,000	5	.....	.....	.....	.....	272,500	Oct.. 1887	.37½
147	Ward Con., s. L.	Colo..	2,000,000	200,000	10	.....	.....	.....	.....	20,000	Dec.. 1889	.05
148	Yankee Girl.	Colo..	2,500,000	250,000	10	.....	.....	.....	.....	1,275,000	July. 1887	.10
149	Yellow Jacket, G. S.	Nev..	12,000,000	120,000	100	5,508,000	Mar..	1889	.50	2,148,000	Aug.. 1871	1.50
150	Weeb City, L.	Mo..	55,000	11,000	5	.....	.....	.....	.....	4,400	July. 1889	.10
151	Woodside.	Utah..	.....	.....	.....	.....	.....	.....	.....	25,000	Oct.. 1889	.25
152	Young America.	Cal..	.....	.....	.....	.....	.....	.....	.....	175,000	.....	1889 .10

NON-DIVIDEND PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and am't of last.		
1	Agassiz Cons., s. L.	Colo..	$2,500,000	50,000	$50	*	.....	.....	.....
2	Allegheny, s.	Colo..	5,000,000	500,000	10	.....	.....	.....	.....
3	Allouez, c.	Mich..	2,000,000	80,000	25	$737,000	Jan..	1890	.70
4	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	112,500	Sept.	1890	.25
5	Alta, s.	Nev..	10,080,000	100,800	100	3,359,800	Sept.	1890	.50
6	Amador, G.	Cal..	400,000	200,000	2	*	.....	.....	.....
7	American Flag, s.	Colo..	1,250,000	125,000	10	300,000	June	1887	.....
8	Amity, s.	Colo..	250,000	250,000	1	.....	.....	.....	.....
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	5	.....	.....	.....	.....
10	Astoria, G.	Cal..	200,000	100,000	2	.....	.....	.....	.....
11	Barcelona, G.	Nev..	5,000,000	200,000	25	*	.....	.....	.....
12	Bechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	Jan..	1883	.10
13	Belmont, s.	Nev..	5,000,000	50,000	100	735,000	April	1886	.10
14	Best & Belcher, G. S.	Nev..	10,080,000	100,800	100	2,279,275	Aug..	1890	.25
15	Big Pittsburg, s. L.	Colo..	20,000,000	200,000	100	*	.....	.....	.....
16	Black Oak, G.	Cal..	3,000,000	300,000	10	*	.....	.....	.....
17	Boston Con., G.	Cal..	10,000,000	100,000	100	170,000	Nov..	1883	.25
18	Bremen, s.	N. M..	5,000,000	500,000	10	*	.....	.....	.....
19	Brownlow, s.	Colo..	250,000	250,000	1	.....	.....	.....	.....
20	Brunswick, G.	Cal..	2,000,000	400,000	5	*	.....	.....	.....
21	Bullion, G. S.	Nev..	10,000,000	100,000	100	2,790,000	Dec..	1889	.25
22	Calaveras, G.	Cal..	500,000	500,000	1	*	.....	.....	.....
23	Carisa, G.	Wy..	500,000	100,000	5	*	.....	.....	.....
24	Carupano, G. S. L. C.	Ven..	200,000	100,000	2	*	.....	.....	.....
25	Cashier, G. S.	Colo..	500,000	250,000	2	*	.....	.....	.....
26	Charles Dickens, G. S.	Idaho	1,250,000	250,000	5	*	.....	.....	.....
27	Cherokee, G.	Cal..	1,500,000	150,000	10	.....	.....	.....	.....
28	Chollar, s.	Nev..	11,200,000	112,000	100	1,540,000	Nov..	1889	.50
29	Cleveland, T.	Dak..	1,000,000	500,000	2	*	.....	.....	.....
30	Colchis.	N. M..	500,000	50,000	10	.....	.....	.....	.....
31	Commonwealth, s.	Nev..	10,000,000	100,000	100	170,000	Nov..	1888	.50
32	Comstock, G. S.	Nev..	10,000,000	100,000	100	35,000	Mar..	1887	.15
33	Con. Imperial, G. S.	Nev..	5,000,000	50,000	100	1,875,000	July.	1890	.05
34	Con. Pacific, G.	Cal..	6,000,000	60,000	100	198,000	June	1890	.10
35	Con. Silver, s.	Mo..	2,500,000	250,000	10	.....	.....	.....	.....
36	Crescent, s. L.	Colo..	3,000,000	300,000	10	*	.....	.....	.....
37	Crocker, s.	Ariz..	10,000,000	100,000	100	150,000	June	1890	.15
38	Crown, G.	N. C..	500,000	500,000	1	.....	.....	.....	.....
39	Dahlonega, G.	Ga..	250,000	250,000	1	*	.....	.....	.....
40	Dandy, s.	Colo..	5,000,000	500,000	10	*	.....	.....	.....
41	Decatur, s.	Colo..	1,500,000	300,000	5	*	.....	.....	.....
42	Denver City, s. L.	Colo..	5,000,000	500,000	10	*	.....	.....	.....
43	Denver Gold, G.	Colo..	300,000	60,000	5	.....	.....	.....	.....
44	Durango, G.	Colo..	500,000	500,000	1	*	.....	.....	.....
45	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar..	1886	1.00
46	El Cristo, G. S.	U.S.C.	1,000,000	500,000	2	.....	.....	.....	.....
47	El Dorado, G.	Cal..	1,000,000	250,000	4	*	.....	.....	.....
48	El Talento, G.	U.S.C.	1,000,000	500,000	2	.....	.....	.....	.....
49	Empire, s.	Utah..	10,000,000	100,000	100	.....	.....	.....	.....
50	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*	.....	.....	.....
51	Exchequer.	Nev..	10,000,000	100,000	100	865,000	July.	1890	.25
52	Found Treasure, G. S.	Nev..	10,000,000	100,000	100	81,500	May.	1890	.25
53	Gogebic I. Syn., I.	Wis..	5,000,000	200,000	25	.....	.....	.....	.....
54	Gold Cup, s.	Colo..	500,000	500,000	1	*	.....	.....	.....
55	Golden Era, s.	Mont.	2,000,000	200,000	10	*	.....	.....	.....
56	Gold Placer, G.	Colo..	5,000,000	200,000	25	229,314	Dec..	1885	.25
57	Gold Rock, G.	Cal..	1,000,000	500,000	2	*	.....	.....	.....
58	Goodshaw, G.	Cal..	10,000,000	100,000	100	*	.....	.....	.....
59	Grand Belt, c.	Tex..	12,000,000	120,000	100	.....	.....	.....	.....
60	Grand Duke.	Colo..	800,000	80,000	10	.....	.....	.....	.....
61	Great Remance, G.	U.S.C.	1,000,000	500,000	2	*	.....	.....	.....
62	Gregory-Bobtail, G.	Colo..	550,000	550,000	1	*	.....	.....	.....
63	Gregory Con., G.	Mont.	3,000,000	300,000	10	.....	.....	.....	.....
64	Harlem M. & M. Co., G.	Cal..	1,000,000	200,000	5	.....	.....	.....	.....
65	Head Cent. & Tr., s. G.	Ariz..	10,000,000	100,000	100	.....	.....	.....	.....
66	Hector, G.	Cal..	1,500,000	300,000	5	45,000	Jan..	1889	.15
67	Highland, c.	Mich..	500,000	25,000	20	.....	.....	.....	.....
68	Holywood.	Cal..	200,000	100,000	2	.....	.....	.....	.....
69	Hortense, s.	Colo..	2,000,000	200,000	10	.....	.....	.....	.....
70	Huron, C.	Mich..	1,000,000	40,000	25	280,000	May.	1887	3.00
71	Iron, Gold & Silver, s.	N. M..	2,000,000	200,000	10	*	.....	.....	.....
72	Ironton, I.	Wis..	1,000,000	40,000	25	.....	.....	.....	.....
73	Iroquois, c.	Mich..	1,250,000	50,000	25	.....	.....	.....	.....
74	J. D. Reymert.	Ariz..	10,000,000	100,000	100	.....	.....	.....	.....
75	Julia Con., G. S.	Nev..	11,000,000	110,000	100	1,463

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Sept. 27. H.	Sept. 27. L.	Sept. 29. H.	Sept. 29. L.	Sept. 30. H.	Sept. 30. L.	Oct. 1. H.	Oct. 1. L.	Oct. 2. H.	Oct. 2. L.	Oct. 3. H.	Oct. 3. L.	Sales.
Alice													
Argenta, Mich													
Atlantic, Micq											22.13		100
Belcher, Nev													
Belle Isle									1.00		.95		40
Bodie Cons., Cal			1.50										100
Bos. & Mont., Mont											55.88		10
Breece, Colo									.47		.52	.49	600
Bulwer, Cal													
Caledonia	1.75												200
Calumet & Hecla, Mich											302½		20
Catalpa, Colo					.39	.37	.39		.40				1,300
Colorado Central													
Confidence, Nev													
Cons. Cal. & Va., Nev	4.65												100
Crown Point, Nev											2.90		100
Deadwood, Dak													
Dunkin, Colo													
Eureka Con													
Father de Smet, Dak													
Franklin													
Freeland, Colo	.37	.36	.36		.35		.36	.35	.35		.35		3,800
Gould & Curry, Nev	2.35				2.35				2.30				350
Hale & Norcross, Nev					2.45								100
Holyoke													
Homestake, Dak			10.25										100
Horn-Silver, Utah			3.40		3.45				3.35		3.35	3.30	650
Independence, Nev													
Iron Hill, Dak													
Kearsarge													
Leadville C., Colo	.15		.15		.15		.18	.16	.18	.16			6,400
Little Chief, Colo					.40		.45	.42					1,000
Mono, Cal	.65												300
Moulton, Mont													
Mt. Diablo, Nev	3.35												75
Navajo, Nev													
N. Belle Isle, Nev													
Ontario, Utah									47.00		46.75		20
Ophir, Nev	5.13		5.38										200
Osceola, Mich													
Plymouth, Cal			2.50		2.25				2.25		2.25		400
Quicksilver, Pref							41.00				41.00		200
" Com													
Quincy, Mich											116¼		30
Robinson Cons., Colo									.50				50
Savage	3.80												200
Sierra Nevada, Nev	3.15												100
Silver Cord							.38	.35	.38	.37			1,800
Silver King, Ariz									.40				10
Silver Mg. of L. V													
Small Hopes											.95		300
Standard													
Stormont, Utah											.07		200
Tamarack, Mich													
Yellow Jacket, Nev	3.50												100

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Sept. 27. H.	Sept. 27. L.	Sept. 29. H.	Sept. 29. L.	Sept. 30. H.	Sept. 30. L.	Oct. 1. H.	Oct. 1. L.	Oct. 2. H.	Oct. 2. L.	Oct. 3. H.	Oct. 3. L.	Sales.
Alpha, Nev													
Alta, Nev	1.25		1.20		1.20				1.15				500
American Flag, Colo							.04						200
Andes, Nev													
Amador, Cal													
Astoria, Cal	.06				.05						.06	.05	2,500
Barcelona, Nev									.15				1,000
Best & Belcher, Nev	3.95		3.85						3.80				300
Bonanza King, Cal													
Brunswick, Cal	.08	.07	.09	.07	.08		.08	.07	.08	.07	.08		13,700
Bullion, Nev													
Butte & Bost., Mont													
Castle Creek, Idaho													
Chollar, Nev	3.30		3.35						3.35				300
Col. & Beaver, Idaho													
Commonwealth, Nev													
Comstock T., Nev							.17						1,300
" bonds													
" scrip													
Con. Imperial, Nev													
Crescent, Colo							.15		.14				1,400
Denver City, Colo													
El Cristo, Rep. of Col							.85		.80	.75	.80		1,900
Exchequer													
Hollywood, Cal													
Huron, Mich							5.75					5.63	300
Julia, Nev	.42				.41						.40	.40	1,500
Kingston & Pembroke													
Kossuth													
Lacrosse, Colo													
Lee Basin, Colo													
Mexican, Nev	3.50		3.55		3.50						3.40		600
Minn. Iron Co., Mich			.85										200
Monitor			.02										300
Mutual Sm. & Mg. Co	1.50	1.45	1.45						1.45		1.50	1.50	2,100
Nevada Queen, Nev													
N. Commonwealth, Nev													
Occidental, Nev									2.25				300
Oriental & Mil., Nev													
Overman, Nev													
Phœnix of Ariz	1.05	.98	1.00	.94	.98		.98	9 0	.95	.85	.99	.91	31,050
Phœnix Lead, Colo													
Potosi	7.13												100
Rappahannock, Va	.06												1,000
Santiago, U. S. C													
S. Sebastian	.55												100
Scorpion													
Shoshone													
Silver Hill													
Silver Queen													
Sullivan Con., Dak													
Sutro Tunnel, Nev				12		.13	.12						2,300
Sutter Creek, Cal	1.35		1.35						1.35			1.35	400
Union Cons., Nev	3.00												100
Utah, Nev	1.25		1.25								1.20		60

* Ex. dividend. † Dealt in at the New York Stock Ex. Unlisted securities. ‡ Assessment paid. § Assessment unpaid. Dividend shares sold, 19,815. Non-dividend shares sold, 63,850. Total New York, 83,165.

BOSTON MINING STOCK QUOTATIONS.

Name of Company.	Sept. 26.	Sept. 26.	Sept. 27.	Sept. 27.	Sept. 29.	Sept. 29.	Sept. 30.	Sept. 30.	Oct. 1.	Oct. 1.	Oct. 2.	Oct. 2.	Sales.
Atlantic, Mich	23.00	22.00			22.00	21.00	20.50	18.75	20.75	20.00	21.50	21.00	2,312
Bodie, Cal													
Bonanza Development	.65	.63	.60	.50	.53		.55	.50	.60				2,800
Bost. & Mont., Mont	58.00	57.25	58.25	56.00	55.75	54.00	55.00	53.00	56.25	55.00	56.00	55.00	7,654
Breece, Colo													
Calumet & Hecla, Mich	305		305		300		300	295	300	299	300		353
Catalpa, Colo	.39		.35								.35		600
Central, Mich									20.00				27
Chrysolite, Colo													
Con. Cal. & Va., Nev													
Dunkin, Colo	.60		.65	.60			.60		.65		.65		1,600
Eureka, Nev													
Franklin, Mich	21.00		21.00	17.00	20.00	18.25	20.50	19.50	21.00	20.00	21.00		2,889
Honorine, Utah													
Horn Silver, Utah													
Kearsarge			18.50	15.75	16.00	15.00	17.00	16.50	19.00	17.00	17.50	17.00	2,090
Little Chief, Colo													
Little Pittsburg, Colo													
Moulton													
Napa, Cal													
Ontario, Utah													
Osceola, Mich	46.00	45.00	45.00	42.00	42.50	40.25	42.00	40.00	43.50	42.00	43.00	40.75	5,587
Pewabic, Mich											14.50		300
Quincy, Mich	125				123	118¼	115				115		197
Ridge, Mich	1.00								.88				150
Sierra Nevada, Nev													
Silver King													
Stormont, Utah													
Tamarack, Mich	203½		205		195	192	188	185	186	184	200	190	419

Name of Company.	Sept. 26.	Sept. 26.	Sept. 27.	Sept. 27.	Sept. 29.	Sept. 29.	Sept. 30.	Sept. 30.	Oct. 1.	Oct. 1.	Oct. 2.	Oct. 2.	Sales.
Allouez, Mich	7.63	7.25	7.25	6.50	6.25	5.63	5.88	5.50	6.00	5.75	6.88	6.00	13,245
Arnold, Mich					1.50								200
Aztec, Mich													
Brunswick, Cal													
Butte & Boston, Mont	19.50	18.75	19.00		18.00	16.00	17.00	16.25			18.50	17.50	2,101
Centennial, Mich	26.00	25.50	25.00		22.00	21.00	22.50	21.25	22.50		23.50	23.00	2,875
Comstock, T., Nev													
Copper Falls Mg													
Crescent, Colo													
Dana, Mich													
Don Enrique, N. M													
El Cristo, S. A													
Hanover, Mich													
Humboldt, Mich													
Hungarian, Mich													
Huron, Mich	5.63	5.38			5.50	5.13			5.50		5.50		1,685
Mesnard, Mich													
National, Mich													
Native, Mich													
Oriental & M., Nev													
Phoenix													
Pontiac													
Rappahannock, Va													
Santa Fe, N. Mex	.58		.58	.55	.55	.53	.53				.53		3,300
Shoshone, Idaho													
South Side, Mich													
Star													
Washington, Mich													
Winthrop, Mich													

Boston: Dividend shares sold, 26,778. Non-dividend shares sold, 23,406. Total Boston, 50,184.

COAL STOCKS.

Name of Company.	Par val. of shares.	Sept. 27. H.	Sept. 27. L.	Sept. 29. H.	Sept. 29. L.	Sept. 30. H.	Sept. 30. L.	Oct. 1. H.	Oct. 1. L.	Oct. 2. H.	Oct. 2. L.	Oct 3. H.	Oct 3. L.	Sales.
American Coal														
Cambria Iron														
Cameron Coal & I.Co														
Ches. & O. RR	100													
Chic. & Ind. Coal RR	100													
Do. pref	100													
Col. C. & I	100	46		47½	46¾			47	46⅝	46¾	46½	46¼	45¼	3,800
Col. & Hocking C. I	100			26	25½	25¾	25	25⅞	25⅝	26	25	25¼	24⅛	3,000
Consolidation Coal	100													
Del. & H. C	100	157¼		156½	155¼	156⅝	154¾	157½	154¼	155	154¼	155	154⅝	2,973
D., L. & W. RR	50	146	144½	148¾	145⅝	147½	146	146¾	144⅞	145¾	144	144	143¼	82,756
Hocking Valley	100	31		31⅛	30⅝	31⅞	30½	31¼		31¼		31	30¾	3,070
Hunt. & Broad Top		23⅝	23½	24¼	23½	24¼		24¼	24	24¼				1,670
Do. pref				48	47½	48				48				385
Illinois C & Coke Co														
Lehigh C. & N	50	52½		52½				52¼	52	52⅝	52¼			250
Lehigh Valley RR	50	52	51⅞	52	51⅞	52	51⅞	52	51¾	52	51⅞			522
Lehigh & Wilk. Coal	100													
Mahoning Coal	100													
Marshall Con. Coal	100													
Maryland Coal								15	14	15				515
Morris & Essex	100													
New Central Coal	50									10	9¼			250
N. J. C. RR	100	118¾	118	119¼	118	118	117	117	115	116	114½	114½	113	5,530
N. Y. & S. Coal	100													
N. Y., Susq. & West	100			6¾		7						6⅞		250
Do. pref	100			28		28						27		608
N.Y. & Perry C. & I	100													
Norfolk & West. RR	50			18						17¾				400
Do. pref	50													
Penn. Coal	50													
Penn. RR	50	52⅝	52⅛	52¾	52⅛	52⅝	52⅛	52⅛	52⅛	52⅝	52⅛			2,939
Ph. & R. RR		41⅛	40¾	41½	39½	40⅝	39¾	40⅞	40¼	40⅝	39⅞	40⅛	37⅝	**138,675
Sunday Creek Coal														
Do. pref	100													
Tennessee C. & I. Co		43½	41¼	43¾	43	42⅛	42	44¾	43¾	44⅛	44	42⅛	42	4,000
Do. pref														
Westmoreland Coal														

**Sales in New York, 95,620; in Philadelphia, 43,055. Total sales, 251,593.

San Francisco Mining Stock Quotations.

Company.	Closing Quotations. Sept. 26.	Sept. 27.	Sept. 29.	Sept. 30.	Oct. 1.	Oct. 2.
Alpha						
Alta	1.10	1.10	1.10		1.05	1.05
Belcher						
Belle Isle	1.00	1.00	1.00		1.00	.90
Best & Bel	3.80	3.75	3.75		3.70	3.60
Bodie	1.45	1.50	1.60		1.65	1.65
Bulwer	.30	.25	.25		.30	.25
Chollar	3.20	3.25	3.20		3.25	3.05
Com'wealth	2.50	2.50	2.50		2.50	2.50
Con. C. & V	4.75	4.75	4.75		4.75	4.80
Con. Pac						
Crown Point	2.90	2.80	2.85		2.75	2.75
Eureka C	4.25	4.25				
Gould & C	2.25	2.30	2.25		2.20	2 15
Grand Prize						
Hale & N	2.35	2.40	2.30		2.30	2.30
M. White						
Mexican	3.40	3.45	3.40		3.30	3.35
Mono	.60	.55	.60		.60	.55
Mt. Diablo	3.25	3.25				
Navajo	.30	.30	.30		.30	.30
Nev. Queen		.80	.85			.80
N. Belle Isle	1.10	1.05	1.15		1.10	1.00
Occidental						
Ophir	5.00	5.13	5.13		5.00	5.13
Potosi	6 75	6.75	6.75		6.75	6.50
Savage	3.70	4.75	3.75		3.70	3.60
Sierra Nev	3.08	3.05	2.95		2.85	2.85
Union Con	2.95	3.00	2.95		2.85	2.35
Utah	1.15	1.15	1.15		1.10	1.05
Yellow Jak	3.45	3.45	3.35		3.40	3.35

STOCK MARKET QUOTATIONS.

Baltimore, Md.

Company.	Bid. L. H.	Asked. L. H.
Atlantic Coal	....	$1.25
Balt. & N. C.	.01@.02	.04@.05
Big Vein Coal	....	1.20@1.30
Conrad Hill	.01	.10
Cons. Coal	.26	.28@.29
Diamond Tunnel	....	....
George's Crk. C.	....	....
Lake Chrome	....	....
Maryland & Charlotte	....	....
North State	.10	....
Silver Valley	.50@.51	.54@.60

Prices bid and asked, lowest and highest, during the week ending Oct. 2.

Birmingham, Ala.

Company.	Bid. L. H.	Asked. L. H.
Ala. Coal & I. Co.	....	$100
Ala. Conn. C. & C. Co.	....	$23
Ala. R. Mill Co.	$60	....
*Alice Furnace	$103	....
Anna Howe G. Mg. Co.	$⅞	$⅞
Bess'mer Land.	....	$35
Bir. Mg. & Mfg.	....	$65
Cahaba Coal Mg. Co.	....	$70
Camille Gold Mg. Co.	$½	....
De Bardeleben C. & I. Co.	....	$76
Decat. L. Imp.	....	$13¾
DecaturMin. L.	$15	$19
Ensley Land	$9½	$10¼
*Eureka	**$99	$102½
Florence L. & Mg. Co.	$19	$20¼
Gadsen Land	$15⅝@$15¾	$5@$ ⅛
Hecla Coal Co.	$10	....
Hen. S. & M. Co	$60	$72½@$73
Jagger-Town'ly C. & C. Co.	$8¼	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	$20	....
Sheffield C. & I. Co.	$50	$55
Sloss I. & S.	....	$40
†Sloss I. & S.	$92	$93
††Sloss I. & S.	....	$63
Tuscaloose C. I. & L. Co.	$22	$23
Tenn. C. & I. Co.	$45¾	$46¼
" pref.	$100	$105
Vulcan C. & C. Co.	$5	....
Woodstock I. Co.	....	$30@$33

Prices, highest and lowest, bid and asked during week ending Sept. 29.
* Bonds. † First mortgage. †† Second mortgage. ** Without interest.

Pittsburg, Pa. Oct. 1.

Company.	B.	A.	Closing
Allegheny Gas Co.	....	....	....
Bridgewater Gas Co.	$45.00	$55.00	$54.00
Chartiers Val. Gas	39.00@40.00		39.00
Columbia Oil Co.	2.75	3.00	3.00
Consolidated Gas Co.	....	....	....
East End E. Light Co.	....	....	....
East End Gas Co	....	....	....
Forest Oil	....	....	....
Hazlewood Oil Co.	50.00	52.00	51.00
La Noria Mining	.17	.19	.17
Luster Mg. Co.	19.00	22.00	20.25
Mansfield C. & C. Co.	....	....	....
Manufacturers Gas Co.	....	....	....
Nat. Gas Co. of W. Va	....	....	....
N. Y. & Clev. Gas Coal	34.00	36.00	35.00
Ohio Valley Gas	....	....	....
Pennsylvania Gas	....	14.25	14.25
People's Natural Gas	....	....	....
People's N. G. & P. Co.	15.00	15.75	15.50
Philadelphia Co.	29.63	30.00	29.75
Pine Run Gas Co.	....	....	....
Pittsburg Gas	....	....	....
Silverton Mg. Co.	1.50	....	1.50
South Side Gas	....	....	....
Tuna Oil Co.	....	67.00	67.00
Union Gas	....	....	....
Washington Oil Co.	....	....	....
W'house Brake Co	....	....	....
W'house A. B. Co.	112.50	115.00	113.50
W'house E. Light	33.00	36.00	33.50
W'moreland & Camb.	....	16.00	16.00
Wheeling Gas	17.00	20.00	19.50
Yankee Girl Mg	3.50	....	3.50

* Actual selling price.

Prices bid and asked and sales during week ending Oct. 1:

Luster Mining	430 shs.	$19¼@$21¾
N. Y. & Clev. Gas Coal	10 "	@$35
Philadelphia Gas Co.	110 "	$29⅝
West. Air Brake	10 "	@$113
West. Electric	95 "	@$33½

St. Louis. Oct. 1.

CLOSING PRICES.

Company.	Bid.	Asked.
Adams, Colo.	$1.90	$2.05
American & Nettie	1.00	1.02½
Aztec, N. Mex.	.08	.09
Bi-Metallic	30.00	34.00
Central Silver	.17½	.18¾
Cleveland, Colo.	.04½	.05
Cleveland & An'r.	....	.12
Coeur d'Alene	.95	1.07½
Elizabeth	....	....
Gold King	....	15
Granite Mountain, Mont.	44.50	45.00
Hope	....	....
I. X. L. Colo.	.01	.01½
La Union	.07½	.08
Little Albert	.33¾	.40
Montrose Placer, Colo.	.58¾	.60
Major Budd, Mont.	.07	.08
Mexican Imp.	....	....
Mickey Breen	1.65	1.70
Mountain Key	.47½	.55
Nellie	....	....
Pat Murphy, Colo.	.13½	.14
Puzzle	....	....
Richmond Hill	....	....
Samoa	....	....
Silver Age, Colo.	2.17½	2 30
Small Hopes, Colo.	.90	.97½
Tourtelotte	.01	.01½
West Granite, Mont.	1.00	1.07½
Wire Patch	.15	.16¼
Yuma, Ariz.	.42½	.46¼

Trust Stocks. Oct. 3.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

Am. Cotton Oil. Tr. Repts.	$193¼@$20
Cattle Trust	@ 14
Distillers' & Cattle Feeders'.	47½@ 48
Linseed Oil	46 @ 48
National Lead	20¼@ 20⅝
Standard Oil	@166½
Sugar Refineries	78 @ 78⅛

Sales at the New York Stock Exchange week ending Oct. 3:

	Sales.	Price H.	Price L.
*American Cotton Oil	3,910	22	19¼
National Lead	15.655	21¼	20⅝
Sugar	131,761	80⅜	76

* Trust receipts.

Foreign Quotations.

London. Sept. 20.

Company.	Highest.	Lowest.
Almada, Mex.	1s. 6d.	1s.
Amador, Cal.	£13-16	£1 1-16
Appalachian, N. C.	9d.	3d.
Canadian Phos. Canada.	£⅛	£¼
Carlisle, N. Mex	3s 6d.	3s.
Colorado, Colo.	4s. 9d.	4s. 3d.
Comstock, Utah	....	....
Cordova	6d.	....
Cons. Esmeralda, Nev.	3s. 6d.	3s.
Denver Gold, Colo.	6d.	....
Dickens Custer, Idaho.	2s.	1s. 6d.
East Arevalo, Idaho.	2s.	1s.
El Callao, Venezuela	£2	£1¾
Elmore, Idaho	2s. 3d.	1s. 9d.
Empire, Mont.	1s. 3d.	9d.
Garfield, Nev.	1s 6d.	6d.
Jay Hawk Mont	1s. 6d.	1s.
Josephine, Cal	1s. 6d.	6d.
Kohinoor, Colo.	2s. 3d	1s. 9d.
La Luz, Mex.	1s. 9d.	1s. 3d.
La Valera, Mex.	22s. 6d.	17s. 6d.
Montana Lt. Mont	21s.	20s.
New California, Colo.	6s. 6d.	6s.
New Consolidated	9d.	3d.
New Eberhardt, Nev.	1s. 3d.	9d.
New Emma, S., Utah	5s. 6d.	5s.
New Flagstaff, Utah	....	....
Newfoundland, N. F.	3s. 6d.	3s.
N. Gold Hill, N. C.	1s 3d.	9d.
New Guston, Colo.	£4¼	£3¾
New Hoover Hill, N. C.	1s. 3d.	9d.
Old Lout, Colo.	£⅝	£⅜
Palmarejo, Mex	17s 6d.	16s. 3d.
Pinos Altos, Mex.	15s.	13s.
Pittsburg Cons., Nev.	9s.	8s.
Richmond Con., Nev.	£1⅛	£⅞
Ruby & Dunderberg, Nev	1s. 6d.	1s.
Sam Christan, N. C.	1s.	6d.
Sierra Buttes, Cal.	5s. 6d.	5s.
" Plumas Eur., Cal.	£13-16	£11-16
Sonora Mex	1s.	6d.
United Mexican, Mex.	8s.	7s.
U. S. Placer, Colo.	1s. 3d.	9d.
Viola Lt., Idaho	2s.	1s. 6d.

Highest and lowest prices during the week ending Sept. 20.

Paris. Sept. 18.

	Francs.
Belmez, Spain	760.00
Callao, Venez.	54 00
Callao Bis, Venez.	6.50
East Oregon, Ore.	7.00
Forest Hill Divide, Cal.	100.00
Golden River, Cal	350.50
" parts	30.00
Lexington, Mont.	121.00
" parts	3.50
Rio Tinto, Spain	678.75
Tharsis, Spain	163 00

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18°, ℔ 100 lbs. 1.00@1.50
Muriatic, 20° ℔ 100 lbs. 1.12½@1.75
Muriatic, 22° ℔ 100 lbs. 1.37½@2.00
Nitric, 36°, ℔ 100 lbs. 4.00@4.20
Nitric, 42°, ℔ 100 lbs. 6.00@6.25
Oxalic, ℔ 100 lbs. 6.50@10.50
Sulphuric, 60°, ℔ 100 lbs. 80@1.25
Sulphuric, 66°, ℔ 100 lbs. 1.00@1.75

Alkali—
Refined, 48 p. c. @2¾
Refined, 58° 2¾@3
Alum—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1⅞@2
Lump, ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10
Aqua Ammonia—18°, ℔ lb. 4¾
20°, ℔ lb. 6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11
Ammonia—Sul., ℔ 100 lbs. 3.15
Carb., per lb. 7½@8½
Arsenic—White, powdered, ℔ lb. 3¼@3½
Red, ℔ lb 5¾@6¾
White, at Plymouth, ℔ ton £12 2 6d.
Asbestos—Am., p. ton $50@$300
Italian, p. ton, c. i. f. L'pool £18@£60
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb. 4½@5½c
Hard Cuban, ℔ ton $28.00
Trinidad, refined, ℔ ton $30.00
Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19½@21.50
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f. o. b. L'pool, ton £6
No. 1, casks, Runcorn " £4 10 0
No 2, bags, Runcorn " 3 15 0
Bleach—Over 35 p.c., ℔ lb. 2@2½
Borax—Refined, ℔ lb. 9½@9⅝
Concentrated 7¾@8⅜
Refined at Liverpool, ℔ ton £29
Brimstone—*See Sulphur.*
Bromine—℔ lb. 37@38
Chalk—℔ ton 1.75
Precipitated, ℔ lb. 4¾@5
China Clay—English, ℔ ton 13.50@18.50
Southern, ℔ ton 13.50
Chrome Yellow—℔ lb. 10@2
Cobalt—Oxide, ℔ lb. 2.60@2.90
Copper—Sulph. English Wks, ton £20@£21
Copperas—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks £1 15s.
Cream of Tartar—Am. 99% 22½
Powdered, 99 p. c. 23
Emery—Grain, ℔ lb. 4½@5
Flour, ℔ lb 2¾@3½
Feldspar—Ground, ℔ ton 15.00
Fuller's Earth—Lump, ℔ bbl. .90@.95
Powdered, ℔ lb. 1⅞@2
Gypsum—Calcined, ℔ bbl. 1.25@1.50
Iodine—Resublimed 2.75
Kainit—℔ ton $9.25@$9.75
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7¼
White, English, ℔ lb 8½@8¾
Acetate, or sugar of, white 12@13
Lime Acetate—Amer. Brown .95@1.00
" Gray 1.75@1.87½
Litharge—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb. 9@9½
Magnesite—Greek, ℔ ton 20.00
Manganese—Crude, per unit 23@.28
Oxide, ground, per lb. 2½@6½
Mercuric-Chloride—(*Corrosive Sublimate*), ℔ lb. 70@72
Mineral Wool—℔ lb. 2
Mica—In sheets according to size, 1st quality, ℔ lb. 25@$6.00
Ochre—Yellow, "B. F.," ℔ ton, f. o. b. mill 30.00
"J. F. L. S.," ℔ lb. ex dock 2½
Phosphate Rock—S. Carolina, per ton, o. b. Charleston 5.75@7.00
Ground, ex vessel New York 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton 16.00
Phosphorus—℔ lb. 70@75
Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7
Potassium—Cyanide, ℔ lb. 39@40
Bromide, ℔ lb. 33
Chlorate, ℔ lb. 13@10
Carb. ℔ lb. 4.70@5.54
Caustic, ℔ lb. 7½@8
Iodide 2.65@2.70
Muriate, ℔ 100 lbs. 1.77½@1.80
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb. 10½@11
Sulphate, ℔ 100 lbs. 2.30@2.35
Yellow Prussiate, ℔ lb. 17½@18
Red Prussiate, ℔ lb. 42@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2¼@2½
Pyrites—Non-cupreous, p. units 10d
Quartz—Ground, ℔ ton. 14.00@16.00
Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 6@10
Salt—Liverpool, ground ℔ sack 75@80
Turk's Island, ℔ bush 25@28
Salt Cake—℔ lb. 60@62½
Saltpeter—Crude, ℔ lb. 5¼@5¾
Refined, ℔ lb. 6@8
Soda Ash—Carb., 48% 100 lbs. 2¾
Caustic, 48% 2¼@2½
Soda Caustic, 60% 3.25@3.35
" 70% 3.00
" 74-76% 2¾
Sal. English, ℔ 100 lbs. 1⅛@1⅝
Sal, American, ℔ 100 lbs. .90
Nitrate, 100 lbs. 1.70
Strontium—Nitrate ℔ lb. 9@9½
Sulphur—Roll, ℔ lb. 1¾
Flour, ℔ lb. 2@
Crude Brimstone, 2s., ℔ ton. 19.00@19.29
Crude Brimstone, 3ds, ℔ ton. 18.50@18.70
Talc—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5
Vermillion—American, ℔ lb. 61
English, ℔ lb. 82@85
Vitriol—(Blue), Ordinary, ℔ lb. 5½@5⅝
Extra, ℔ lb. 7
Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb. 6½@7
* Spot.

THE RARER METALS.

Aluminum—(Metallic), ℔ lb.	$2.@$2.50
Sheet, per lb.	2.50
Arsenic—(Metallic), per lb.	.40
Barium—(Metallic), per gram	$4.00
Bismuth—(Metallic), per lb.	2.75
Cadmium—(Metallic), per lb.	1.00
Calcium—(Metallic), per gram	10.00
Cerium—(Metallic), per gram	7.50
Chromium—(Metallic), per gram	1.00
Cobalt—(Metallic), per lb.	6.00
Didymium—(Metallic), per gram	9.00
Erbium—(Metallic), per gram	7.50
Gallium—(Metallic), per gram	140.00
Glucinum—(Metallic) per gram	12.00
Indium—(Metallic), per gram	9.00
Iridium—(Metallic), per oz.	7.00
Lanthanum—(Metallic), per gr.	13.00
Lithium—(Metallic), per gram	10.00
Magnesium—Per lb.	4.50
Manganese—Metallic, per lb.	1.10
Chem. pure, per oz.	10.00
Molybdenum—(Metallic), per gm.	.50
Niobium—(Metallic), per gram	5.00
Osmium—(Metallic), per oz.	65.00
Palladium—(Metallic), per oz.	35.00
Platinum—(Metallic), per oz.	15.00
Potassium—Metallic, per lb.	28.00
Rhodium—(Metallic), per gram.	5.00
Ruthenium—(Metallic), per gm.	5.50
Rubidium—(Metallic), per gram	2.00
Selenium—(Metallic), per oz.	1.80
Sodium—(Metallic) per lb.	2.50
Strontium—(Metallic), per gm.	.60
Tantallum—(Metallic) per gram	9.00
Telurium—(Metallic) per lb.	5.00
Thallium—(Metallic) per gram.	.25
Titanium—(Metallic) per gram.	2.25
Thorium—(Metallic) per gram	17.00
Tungsten—(Metallic) per oz.	2.25
Uranium—(Metallic), per lb.	5.00
Vanadium—(Metallic), per gm.	22.00
Yttrium—(Metallic), per gram	9.00
Zirconium—(Metallic), per oz.	65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000	3.00@3.25
Jerseys, ℔ 1,000	4.50@5.00
Up Rivers, ℔ 1000	5.00@5.50
Haverstraw seconds, ℔ 1000	5.25@5.50
Haverstraw firsts, ℔ 1,000	5.50@6.00
Fronts, nominal, ℔ 1000.	
Croton	14.00@16.00
Wilmington	20.00@21.00
Philadelphia	@22.00
Trenton	@22.00
Baltimore	
Building Stone—Amherst freestone, ℔ cu. ft.	95@1.00
Brownstone, ℔ cu. ft.	1.00@1.35
Granite, rough, ℔ cu. ft.	45@1.25
Granite, Scotch ℔ cu. ft.	1.00@1.15
Cement—Rosendale, ℔ bbl	.85@1.10
Portland, American, ℔ bbl	2.15@2.45
Portland, foreign, ℔ bbl	2.40@2.50
Portland " special brands	2.60@2.85
Roman, ℔ bbl.	2.75@2.90
Keene's coarse, ℔ bbl.	4.50@5.50
Keene's fine, ℔ bbl.	7.25@8.50
Slate—Purple and green roofing, ℔ 100 ft.	7.00@7.50
Red roofing, ℔ 100 sq. ft.	12.00
Black, roofing, ℔ 100 sq. ft.	4.25@5.50
Lime—Rockland, common ℔ bbl.	1.00
Rockland, finishing, ℔ bbl	1.20
St. John, com. and finish, ℔ bbl.	.90@.95
Glens Falls, com. and fin., ℔ bbl	.85@1.10
Labor—Ordinary, ℔ day	1.50@2.00
Masons, ℔ day	4.00
Plasterers, ℔ day	4.00
Carpenters, ℔ day	3.50
Plumbers, ℔ day	3.50
Painters, ℔ day	2.50@3.50
Stonesetters, ℔ day	3.50@4.00
Tilelayers, ℔ day	3.50@4.50
Bricklayers, ℔ day	4 00

THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.

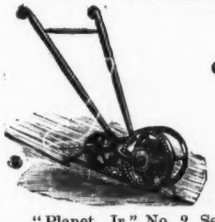
NEW YORK PRICES CURRENT. OCT. 4, 1890.

In the interest of the extension of the markets for American manufactures the ENGINEERING AND MINING JOURNAL has secured the services of gentlemen thoroughly acquainted with the export trade and with foreign markets, and it offers its services to foreign buyers who may desire information concerning any article whatever of American manufacture. No charge will be made for these services, either directly or indirectly through commissions on goods purchased. The proprietors of the ENGINEERING AND MINING JOURNAL are neither commission merchants nor exporters, but they have many sources of information, both at home and in foreign countries, and place these at the service of manufacturers and exporters here and of importers and consumers in other countries.

The names and addresses of the manufacturers of goods quoted in this list can be obtained by applying at this office.

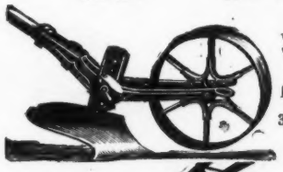
Discounts are for Wholesale Export.

Agricultural Implements.



"Planet, Jr." No. 2 Seed Drill, $9.
Dis. 30%.

Combined Drill Cultivator Rake, Plow, etc., $12. Dis. 30%.

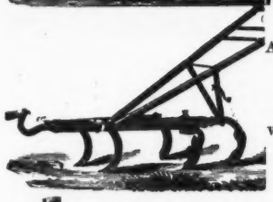


"Fire Fly" single-wheel Hoe, Cultivator and Plow, $5.

"Fire Fly" Hand Plow, $2.50.

30 % discount, f.o.b. New York.

All Steel Horse Hoe and Cultivator combined, with wheel, $6 75-100 net.



All Steel Plain Cultivator.

With wheel, $4.80; without wheel, 60c.

HAY FORKS.

Gold Finish, Patent Overcaps.

Three Tine Forks.

No.	Tine.	Handles.		Per doz.
30	10 in.	4½ ft.	Boy's	$7.75
32	12 "	4 to 6 ft.		9.00
32 S	12 "	"	Strapped	10.50
32 B	12 "	"	Bent	9.50
32 B S	12 "	"	Bent & St'pd	11.00
33	12 "	"		9.50
33 S	13 "	"	Strapped	11.00
33 B	13 "	"	Bent	10 00
33 B S	13 "	"	Bent & St'pd	11.50
34	14 "	"		10.25
34 B	14 "	"	Bent	10.75
35	15 "	"		11.25
35 B	15 "	"	Bent	11.75
42 B	12 "	"	Bent	12.50
42 B S	12 "	"	Bent & St'pd	14.00

Manure Forks, Solid Steel Shanks, Gold Bronze Finish, Patent Overcaps.

No. 44, oval, 4 tine, 12 in. tine, 4 ft. handle, plain ferrules, $12.50 per doz.

No. 44 S, oval, 4 tine, 12 in. tine, 4 ft. handle, strapped ferrules, $14.

No. 44½, oval, 4 tine, 12 in. tine, 4½ ft. handle, plain ferrules, $12.50.

No. 44½ S, oval, 4 tine, 12 ft. tine, 4½ ft. handle, strapped ferrules, $14.

No. 54, oval, 5 tine, 13 in. tine, 4 ft. handle, plain ferrules, $10.50.

No. 54 S, oval, 5 tine, 13 in. tine, 4 ft. handle; strapped ferrules, $21.

No 64, oval, 6 tine, 13 in. tine, 4. ft. handle, plain ferrules, $22.50.

No. 64 S, oval, 6 tine 13 in. tine, 4 ft. handle. strapped ferrules, $24.

PLOWS.

Reversible Oneonta Clipper.

16. Oneonta Clipper, Reversible, Iron beam Cutter $14
" Oneonta Clipper, Reversible, Iron Wheel and Cutter 15
18. Oneonta Clipper, Reversible, Iron Beam Cutter 15
" Oneonta Clipper, Reversible, Iron Beam, Wheel and Cutter 16
17. Hard Metal, Reversible, Iron Beam Cutter 17
17. Hard Metal, Reversible, Iron Beam, Wheel and Jointer 17
19. Hard Metal, Reversible, Wood Beam Cutter 16
" " " " " " Wheel and Jointer 17
20. Steel Mould Board, Reversible, Wood Beam Cutter 15
" " " " " " " Wheel and Cutter 16

Iron Beam Plows.

Two-horse Sod and Stony Land.... 8.50 plain.
Curtis's Sod Two horse ..... 11.5C "
" " " " ..... 13.00 cutter.
" " " " ..... 14.25 wheel & cutter.

Subsoil Plows.

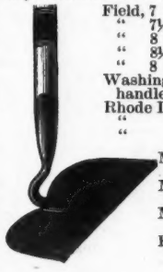
Two-horse 9.50 Draft Rod.
" " 11.00 Wheel and Draft Rod.

Hitchcock's Potato Digger and Shovel Plow.

Improved adjustable handle shovel plow 7.00
Hitchcock's Potato Digger 8.00
" " " and shovel plow 10.50
Dis. 30%.

HOES.

Ely Standard C. S. Blade Solid Shank Hoes.



Field, 7 × 5 in., selected handles.. $8.00
" 7½ × 4½ " " " " .. 8.00
" 8 × 4¾ " " " " .. 8.00
" 8½ × 4½ " " " " .. 8.00
" 8 × 5 " " " " .. 8.00
Washington County Pattern, spring handles 10.00
Rhode Island, 7 to 9 in., spr'g handles 9.00
" " 9½ in. " " 9.25
" " 10 " " " 9.50
Meadow, 9 × 4 in., selected handles 8.00
Meadow, 9½ × 3½ in., " handles 8.25
Meadow, 10 × 3½ in., " handles 8.50
Field, 7½ × 4½ in., selected handles 8.00
Dis., 60%.

RAKES.

The S. R. N. Improved.
22 Teeth Rake, $32.00
26 " " 34.00
25% dis.

Chieftain Lock Lever
No. 1 ..... $30.00
No. 2. ..... 30.00
No. 5. ..... 29.00
Iron wheels, $2 extra. With Pole, Double Tree and Neck Yoke, $2 extra. 22 cubic feet packed, 400 lbs. gro., 225 lbs. net.

Golden Farmer Self-Dumping Rake, $37.00; 22 cu. ft., 430 lbs. gro., 250 lbs. net.

Chieftain Hay Tedders, $59.00; 700 lbs. gro., 450 lbs. net.

Potato Diggers, $7.00; 100 lbs. gro., 60 lbs. net; dis., 40% f.o.b. ship New York or Boston.

RAKES (GARDEN).

Braced steel garden rakes. Per doz
8 teeth $8.00
10 " 9.00
12 " 10.00
14 " 11.00
16 " 12.00

Braced malleable garden rakes.
10 teeth $5.50
12 " 6.00
14 " 6.50
16 " 7.00

Ten-Teeth	Malleable Garden. Plain.	Braced.	Steel Garden. Plain.	Braced.
10-Teeth	$5.50	$6.00	$9.00	$10.50
12 "	6.00	6.50	10.00	11.50
14 "	6.50	7.00	11.00	12.50
16 "	7.00	7.50	12.00	13.50

Dis. 70 and 5%.

Cast steel garden rakes.

	Per doz.
10 teeth, polished, tapering bar, tempered rake.	$9.00
12 " " " " " "	10.00
14 " " " " " "	11.00
16 " " " " " "	12.00

Cast steel lawn rakes.

12 teeth, polished, tapering bar, tempered rake $10.00
14 teeth polished tapering bar, tempered rake 11.00
16 teeth polished tapering bar, tempered rake 12.00
18 teeth polished tapering bar, tempered rake 13.00
Dis. 70% from Standard Association list. Prices made where XX handles, etc., are required.

SCYTHES (GRASS).

Waldron's pattern, oiled	$8.50
Silver steel, painted	8.50
Western dutchman, bronzed and painted	9.00
Clipper, polished web	9.00
Fine cutlery steel, full polished	10.00
All steel, full polished	11.00

Grain Scythes.

Waldron's pattern, oiled	11.25
Silver steel, painted	11.25
Clover, oiled	11.25
Clipper, bronzed and painted	11.50

Lawn Scythes.

Clipper, bronzed and painted	9.00

Dis., 40 and 10%.

SOWER, BROADCAST SEED.

Per dozen ..... $36 f.o.b.
Gross wt., 110 pounds per dozen
Net wt., 75 pounds per dozen.

Anvils.

"Eagle anvils.

	Weight about				Weight about	
No. 000	½	lb	$1 00	No. 4	40	lbs. $4.25
" 00	4	"	1.70	" 5	50	" 5.05
" 0	10	"	2.20	" 6	60	" 5.50
" 1	15	"	2.75	" 7	70	" 6.00
" 2	20	"	3.00	" 8	80	" 7.00
" 3	30	"	3.75	" 9	90	" 8.00

Anvils weighing 100 to 800 lbs., 10 cts. per lb. Discount 20 and 10 %.

Arms and Ammunition.

Wood Powder.

	Kegs, 25 lbs.	¼ kegs. 6¼ lbs.	1 lb. cans.
Trap for first quality arms only	$19.50	5.00	.85
A, for large bore. C, for general use. D, fine for small bore and rifles. E, very fine for small bore rifles and gallery shooting	17.00	4.35	.75

	Discount. Per cent.	
Bullet Breech Caps ..... per lb.	1.60	10
Cortical Bullet Caps ..... "	1.75	10
Rim Fire Cartridges	60	10
Military Rim Fire Cartridges	15	10
Central Fire Pistol and Rifle Cartridges	40	10
Central Fire Metallic Cartridges for Target and Sporting Rifles	30	10
Military Cartridges, Central Fire	30	10
Lefaucheux Cartridges		6

		Special
Gatling Cartridges		
Primed Shells and Bullets	25	10
Friction Cannon Primers	20	10
Primers		10
Percussion Caps, F. C ..... per M.	33c.	
U. M. C. " .	42½c.	
Musket " .	45c.	
Brass Shot Shells, U. M. C., 1st qual	60	10
Club brand	65	10

Paper Shot Shells.

14, 16 and 20 ga. First quality, 30, 10 and 10 per cent; 4, 8, 10 and 12 ga., First quality, 25, 10 and 10 per cent.

14, 16 and 20 ga. Club brand, 30, 10 and 10 per cent. 10 and 12 ga. Club brand, 33⅓, 10 and 10 per cent, Gun Wads, 20 and 15 per cent.

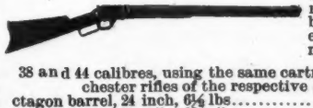
RIFLES.

Colts' Lightning Magazine.

			Discount 10 per cent
40/60 and 45/60 calibre octagon barrel	...	10 lbs.	$15.38
" " " " round	"	... 9¼ "	14.25
" " " " carbine	"	... 9 "	14.25
32, 38, and 44 calibres, octagon	"	... 7¼ "	13.50
" " " " round	"	... 6¾ "	12.38
" " " " carbine	"	... 6¼ "	12.38
" " " " baby carbine	"	... 5¼ "	12.38
22 calibre, rim fire, octagon barrel			15.38
" " round			14.25

Remington Light (Baby) carbines. 44 cal., nick.. $7.50.

MARLIN RIFLE. MODEL, 1889.

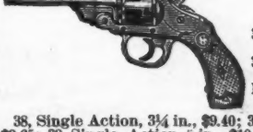


The best in the market, embodying all latest improvements.

38 and 44 calibres, using the same cartridges as Winchester rifles of the respective sizes.

octagon barrel, 24 inch, 6¼ lbs			$19.50
" " 26 " 6¾ "			21.50
" " 28 " 7 "			23.50
Round " 24 " 6¼ "			18.50
Carbine " 20 " 5½ "			17.50

Discount, 25, 10 and 10%.



REVOLVERS.

S & W.

32, Single Action, 3, 3½ in., $8.00.
32, Double Action, 3, 3½ in., $9.35.
32, Safety Hammerless, 3, 3½ in., $ .00.

38, Single Action, 3¼ in., $9.40; 38, Single Action 4 in., $9.65; 38, Single Action, 5 in., $10.00; 38, Double Action, 3¼ in., $10.40; 38, Double Action, 4 in., $10.65; 38, Double Action, 5 in., $11.00; 38, Safety Hammerless, 3¼ in., $12.00; 38, Safety Hammerless, 4 in., $12.25; 38, Safety Hammerless, 5 in., $12.50; 44, Single Action, 4 in., $11.50; 44, Single Action, 5 in., $11.75; 44, Single Action, 6, 6¼

in., $12.00; 44, Double Action, 4 in., $12.50; 44, Double Action, 5 in., $12.75; 44, Double Action, 6½ in., $13.00; 44, Double Action Favorite, 5 in., $12.75.

Colts.

Discount, 10 per cent from following prices.

Double Action Army, 44 and 45 calibre, 4¾, 5½, 7½ inch bbl., $13.00.
Double Action, 41 calibre, 2½ to 6 inch bbl., $11.20.
" " 38 " 2½ to 6 " " $10.00.
Single " Army, 45 calibre, 4¾, 5½, and 7½ inch bbl., $12.00.
Single Action Army, 44 calibre, "Frontier," 4¾, 5½, and 7½ inch bbl., $12.00.
New Line, 41 calibre, blued or nickeled, $4.00.
" " 32 " " " 4.00.
" " 30 " " " 2.00.
" " 22 " half or full plate, 2.10.
Old Model, 22 calibre, by the hundred, half or full plate, $1.50.
Colt Deringer. 41 calibre, per pair half or full plate, 5.50.

American Bull Dog

Double Action 32, 38 and 44 calibre, 2½ inch barrel, $1.60; Double Action 32, 38 and 44 calibre, 4½ inch barrel, $1.85; Double Action 32, 38 and 44 calibre, 6 inch barrel, $2.10.

F. & W. British Bull Dog revolvers, 32 and 38 calibre 2½ inch bbl., $1.80.
F. & W. Automatic revolver, 32 and 38 calibre, 3¼ inch bbl . $5.50.
H. & R. Automatic revolver, 32 and 38 calibre, 3¼ inch bbl., $4.75.
Defender revolvers, Single Action, 22, wood handle, 65.
" " " " 22, rubber " 70.
" " " " 32, wood " 85.
" " " " 32, rubber " 90.
Remington Army revolver, Single Action, 44 cal., frontier cartridge, 5¾ inch barrel, $6.50.
Remington Army revolver, Single Action, 44 cal., frontier cartridge, 7½ inch barrel, $6.00.
Remin gton Double Deringers, 41 cal., rim fire, $4.05.
National Deringers, 41 calibre, per pair, half or full late, $4.00.
New House, 41 or 38 calibre, blued or nickeled, $5.00.
" Police, 38 calibre, 6 in., " " 7.00.
" " 38 " 4½ in., " " 7.00.

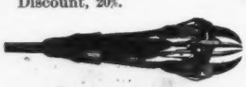
Asbestos Goods.

THE PATENT "AIR-SPACE" COVERING.

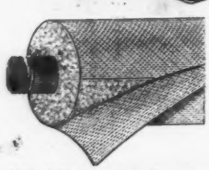
Patent air-space coverings. Per sq. ft., 25c. Discount, 20%.

Wick packing, per pound, 50c. Discount, 20%.

Removable pipe coverings. } Sq. ft. 20c. Disc., 20%.



Tube cleaner, "The National." Per inch, $1. Discount, 50%.



Fire felt covering for steam pipes. Per sq. ft., 25c. Discount, 20%.
Piston Packing. Per pound, 50c. Discount, 20%.

Asbestos Fibre for filtering	per	lb.	40c.	disc 20%
" Cord and Sewing Twine	"	"	$1.50	" 20%
Asbestos cloth, 36 inches wide	per	yard	2.00	" 20%
" cement for boilers	per	bbl.	4.00	" 25%
" sheathing	per	lb.	.18	" 20%
" building felt	"	"	.14	" 20%
" hair felt for hot and cold water pipes	per	sq. ft.	.10	" 25%
Asbestos mill board	per	lb.	.18	" 20%
" soldering blocks	per	doz.	6.25	" 25%

Assay Furnace.
Hydro-Carbon Blow-Pipe Assay Furnace.

No. 2, Muffle Furnace taking C Battersea Muffle 8x4¾x3 in.....$10.00
No. 3, taking F Muffle, 10x6x4 in..... 15.00
No. 1, Crucible Furnace, taking Battersea, U or Colorado B Crucible, 4 in. dia. 5¼ deep.. 4.00
No. 2, taking Battersea E, round, 5 in. dia., 6½ deep..... 5.00

Blow-Pipe No. 1, with half gallon tank, made of plain, strong sheet metal..... 18.00
Blow-Pipe No. 2, with half gallon tank, made entirely of seamless brass..... 23.00
Blow-Pipe No. 3, with one gallon tank, otherwise same as No. 2..... 26.00
Blow-Pipe No. 1, Muffle Furnace No. 2, and Crucible Furnace No. 1..... 32.00
Blow-Pipe No. 2, Muffle Furnace No. 2, and Crucible Furnace No. 1..... 37.00

Axes, etc.
Axes, Handled.

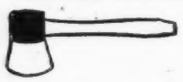
Brands,	Collins. doz.	Sharp. doz.	Pecks. doz.
Dis., %	10	35	Net
3½@4¼ lbs.	$10.75	$15.00	9.50
4½@5¼ lbs.	11.00	15.50	9.50
4¼@6 lbs.	11.50	16.00	10.00
5@7 lbs.	12.50	17.50	11.00

Brands,	Hurd. doz. Net	American Ideal. doz. Net	Blair. doz. Net	Free-man. doz. Net
3½@4¼ lbs.	$8.50	$11.00	$8.00	$6.50
4½@5¼ lbs.	8.50	11.00	8.00	7.00
4¼@6 lbs.	8.75	11.25	8.25	7.00
5@7 lbs.	9.00	11.50	8.50	7.50

Brands,	Collins. doz.	Hunt. doz.	Sharp. doz.	Pecks. doz.
Dis., %	10	45	50	50
Three-quarter axe	$8.00	$13.50	$13.50	$13.50
Brands.				
Boys' axe, No. 2	8.00	13.50	13.50	13 50
Half axe	7.00	12.50	12.50	13.00
Quarter axe	6.50	10.00	10,00	11.00

Brands,	Collins. doz.	Hurd. doz.	Free-man. doz.
Dis., %	60 5	50 5	25
Three-quarter axe	$13.50	$13,50	$7.50
Boys' axe, No. 2	13.50	13.50	7.50
Half axe	12.50	12.50	6.50
Quarter axe	12.00	12.00	6.00

Hatchets, with handles.



AXE PATTERN.
Both patterns, same price.

HUNTER'S.

	Collins.	Hunt.	Sharp.	Pecks.	Simmons.	Hurd.
Dis., %	10	45	50	45	50	50.5
Dozen	$6.00	$10,00	$10.00	$9.00	$9.00	$10.00

SHINGLING.

Shingling. Brands,	Collins.	Sharp.	Pecks.	Mann.	Hurd.
Dis., %	10	50.5	50	50.5	50.5
No. 1 Doz	$4.75	$8.00	$8.00	$8.00	$8.00
No. 2 "	5,25	8.50	8.50	8.50	8.50
No. 3 "	5.75	9.00	9.00	9.00	9.00

CLAW.

Claw. Brands.	Collins.	Sharp.	Blair.	Mann.	Hurd.
Dis., %	10	50, 5	60, 5	50, 5	50, 5
No 1. Doz	$5.25	$9.00	$9.00	$9,00	$9.00
No. 2. "	5.75	9.50	9 50	9.50	9.50
No. 3. "	6.25	10.00	10.00	10.00	10.00

LATHING.

Lathing. Brands.	Collins.	Sharp.	Pecks.	Blair.
Dis., %	10	50, 5	50	60, 5
No. 1. Doz	$4.75	$6.75	$8.00	$8.00
No. 2. "	5.25	7.50	8.50	8.50
No. 3. "	5.75	8.25	9.00	9.00

BROAD.

Broad. Brands.	Collins.	Hunt.	Sharp.	Pecks.	Blair.
Dis., %	10	45	50	50	60, 5
No. 2. Doz		$11.50	$11.50	$11.00	$11.50
No. 3. "	7.50	13.00	13.00	13.00	13.00
No. 4. "	8.00	14.50	14.50	14.50	14.50
No. 5. "	9.00	16.50	16.50	16.50	16.50
No. 6. "	10.00	18.00	18.00	18.00	18.00

Broad Axes. Steel polls.

Brands.	Collins.	Hunt.	Sharp.	Pecks.
Dis., %	10	45	50	45
Dozen	$20.00	$30.00	$29.00	$32.00

YANKEE, OR OHIO. PENNSYLVANIA. NEW ORLEANS.

Brands.	Collins.	Hunt.	Sharp.	Pecks.	Blair.	Mann.	Hurd.
Dis., %	10	45	50	45	60, 10	50	50, 5
Dozen	$19.00	$32.00	$32.00	$32.00	$32.00	$32.00	$32.00

Handled, extra, $4.

Adzes.

RAILROAD. Brands.	Collins.	Hunt.	Sharp.	Pecks.	SQUARE HEAD. SHIP CARPENTER'S Hurd
Dis., %	10	45	50	50	50, 50
Rail'd, heavy, doz	$14.00	$26.00	$26.00	$26.00	$26.00
Flat head "	15.00	24.00	24.00	24.00	24.00

Brands.	Collins.	Hunt.	Sharp.	Pecks.	Hurd.
Dis., %	10	45	50	50	50, 100
Square head, doz	$12.50	$24.00	$24.00	$24.00	$24.00

Brands.	Collins.	Hunt.	Sharp.	Pecks.
Dis., %	10	45	50	45
Ship Carpenter's or Spur Head, doz	$13.00	$25.00	$25.00	$25.00

Brands.	Collins.	Hunt.	Sharp.
Dis., %	10	45	50
Cooper's, handled and bolted, doz	$16.00	$27.00	$25.00

Axle Grease.
Frazer's (2-lb. tins), per gross..... $18.00
2-lb. wooden boxes, " 12.00
Discount, 25 and 5 %.
Dixon's Everlasting, boxes 1 lb., per doz..... $1.20
" " " 2 lbs., " 2.00
See Oils, page 10.

Bellows.

Miner's Bellows: 24 in., $8.50; 26 in., $9.75; 28 in., $11.00; 30 in., $11.25; 32 in., $13.50.
60 and 5% dis.
Standard, each: 18 to 24 in., $10; 28 in., $12; 32 in., $14; 34 in. $16; 36 in., $18; 38 in., $20; 40 in., $23; 44 in., $32.
60 and 5% dis.
Hand Bellows, per doz.: 6 in., plain, $10; fancy, $20; 7 in., plain, $12; fancy, $24; 8 in., plain, $14; fancy, $28; 9 in., plain, $16; fancy, $32; 10 in., plain, $18; fancy, $36.
50% dis.

Belting.

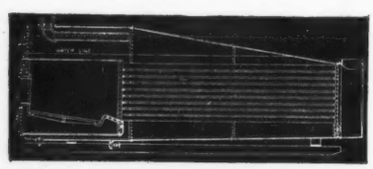
LEATHER BELTS.
Standard Manufacturers List.
Single belts per foot.

Width.		Width.		Width.	
1 inch	.10	6 inch	.76	20 inch	2.84
1¼ "	.13	7 "	.90	21 "	3.02
1½ "	.17	8 "	1.02	22 "	3.20
1¾ "	.20	9 "	1.15	23 "	3.37
2 "	.23	10 "	1.29	24 "	3.54
2¼ "	.26	11 "	1.42	26 "	3.92
2½ "	.30	12 "	1.55	28 "	4.30
2¾ "	.33	13 "	1.68	30 "	4.64
3 "	.36	14 "	1.82	32 "	5.00
3½ "	.43	15 "	1.98	34 "	5.35
4 "	.50	16 "	2.14	36 "	5.70
4½ "	.56	17 "	2.31	40 "	6.40
5 "	.63	18 "	2.49	44 "	7.10
5½ "	.70	19 "	2.66	48 "	7.80

Double belts twice the price of single.
Dis. single and double belts, cemented, 50 and 5%.
Dis. single and double belts, riveted and cemented, 50 and 5%.
Dis. single belts, cemented and lacesewn, water proofed, 50%.
Dis. double belts, cemented and lacesewn, water proofed, 45%.
See Rubber Belting, page 7.
See Link Belting, page 9.

Boiler (Scotch Flue).

Self-contained. Portable.



Economical. Durable.

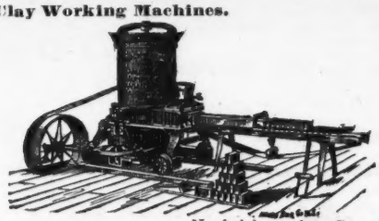
Horse power	8	10	15	20	25	30	35
Diameter	28"	32"	32"	36"	40"	40"	44"
Length, feet	9½	10	12¼	13¼	14¾	16¼	16¾
Weight, pounds	3500	4000	4500	5 00	6500	6900	7500
Price, $	....	....	387	487	580	634	767
Horse power	40	45	50	55	60	70	80
Diameter, inches	44	48	48	52	52	56	56
Length, feet	17½	16½	18	17½	18½	18	19
Weight, pounds	8000	8500	8800	9500	10,000	11,000	12,000
Price, $	827	920	1027	1147	1227	1387	1500

Discount, 15%.

Brick Machinery.

Heavy Steam Power Machine	$525.00
Horse-Power Machines	300.00
Additional Horizontal Pugmill	225.0
Brick Moulds	$2.50 to $3.00
Brick Trucks	5.00 to 13.50
Brick Barrows	7.25
Brick Barrows with Springs	8.20
Sand Barrows, steel tray	6.40

Clay Working Machines.



	No. brick per day.	Complete
No. 10 D brick machine	50,000	$1,500
No. 10 S " "	30,000	1,200
No. 4 " "	40,000	1,100
No. 7 S " "	20,000	650
No. 6 S " "	15,000	575
No. 2 E. H. P. "	6,000	3,360

Brushes.

PAINT BRUSHES.
Intermediate prices not quoted.
Prices per dozen.

	No. 6.	4.	2.	0.	3-0.	5-0.	7-0.	Dis
X	$1.15	$1.80	$2.50	$3.15	$4.00	$5.25	$6.75	25%
Atlantic	1.25	2.15	3.80	5.25	7.00	10.00	13.00	25%
Standard	1.60	2.60	4.00	6.00	8.00	11.00	16.00	25%

VARNISH OVAL.

	No. 6.	4.	2.	0.	3-0.	5-0.	7-0.	Dis.
Globe	$1.15	$1.80	$2.50	$3.25	$4.60	$6.00	$8.00	25%
Crown	1.25	2.00	2.75	4.00	5.25	7.00	10.00	25%

VARNISH FLAT.

	No. 1.	1½.	2.	2½.	3.	Dis,
X	$0.48	$0.72	$0.96	$1.20	$1.40	25%

SASH BRUSH.

	No. 1.	3.	5.	7.	9.	Dis
X	$0.25	$0.40	$0.60	$0.85	$1.20	25
XX	0.40	0.75	1.10	1.40	2.00	25%

WHITE-WASH.

	No. 6.	7.	8.	Dis.
Brown	$1.25	$1.60	$2.00	25%
Pure	2.40	4.00	6.00	25%

SHOE
Per gross.

8.	9.	25.	15.	26.	Dis.
$10	$11.50	$12.50	$15	$18	25%

Per gross dis., 25%.

No. 23	27.	32.	29.	35.
$11.50	$20.00	$24.00	$28.00	$30.00

HORSE.
Patent.
Per gross, dis., 25%.

$18.00	$20.00	$24.00	$30.00

Per gross, dis., 25%.

Wood back	$12	$15	$18	$24

Per gross, dis., 25%.

Leather back	$24	$31.50	$42	$54

SCRUB.
Patent.
Per gross, dis., 25%.

$12.00	$16.00	$18.00

Per gross, dis., 25%.

$6.50	$8.50	$12	$14	$18

SHAVING.
Per doz., dis., 25%.

$0.36	$0.60	$1.00	$1.50	$2.50

COUNTER.

Per doz., dis., 25%.

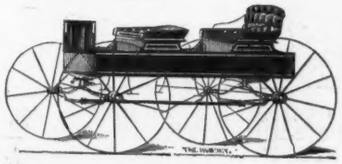
$2.00	$3.00	$4.00	$5.00

Carriages, Etc.

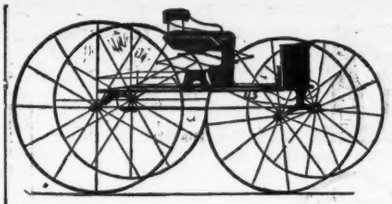
Windsor Surrey.
Open, $150.
Canopy top, $180.
Leather extension top, $210
Pole or shafts.

Cut under Surrey.
Canopy top, $185.
Leather extension top, $220

Brewster Spring.
Open, $65.
Rubber top, $80.
Leather top, $110.



Runabout, $65.



Buckboard. $30 ; shafts.

No. 0. Cart, top and fenders	$150
No. 1. Cart, top and fenders	90
No. 2. Cart, one man cart, open	65
No. 2. Cart, one man, top.	86
No. 2. Cart, one man, top and fenders	90
No. 3-H. Cart, two man, open	54
No. 4. Cart, two man, top.	86
No. 5. Cart, two man, top and fenders	90
No. 6. Cart, two men, top and fenders	90
No. 7. Two-man combination cart	110

Wide track 5 feet.
Narrow track 4 feet 8 inches.
Discount 33⅓ per cent. off.

Crucibles.

Battersea Crucibles, Triangular.

No.	Height. Inches.	Width. Inches.	Crucibles. Per doz.	Covers. Per doz.
S	4½	4½	$1.00	$0.50
T	4	3¾	0.80	0.50
U	3½	3¼	0.60	0.40
V	3¼	2⅞	0.45	0.40
W	2⅞	2⅝	0.35	0.30
X	2½	2¼	0.30	0.30
Y	2⅛	2⅛	0.25	0.30
Z	1¾	1⅞	0.20	0.30

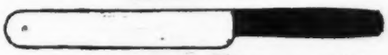
Battersea Muffles, any size, made to order.
See Illustration in advertisement.

No.	Long. Inches.	Wide. Inches.	High. Inches.	Price. Each.
A	7	3½	2½	$ .60
B	7½	4⅜	2⅞	.75
C	8	4¾	3	.85
D	8½	5	3¼	1.00
E	9	5½	3⅝	1.15
F	10	6	4	1.25
G	11	4	3½	1.00
H	10½	5¼	3⅝	1.00
J	12	6	4	1.25
K	14	8	5	1.75
L	15	9	6	2.00

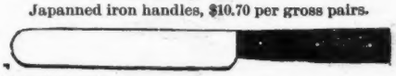
Export discount 15 %.

Cutlery.

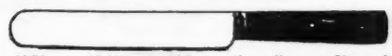
KNIVES—TABLE.



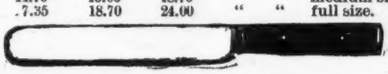
Japanned iron handles, $10.70 per gross pairs.



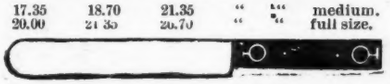
Cocobola handles.	Ebony handles.	Bone handles.	
10.70	12.00	15.35	gross pairs.



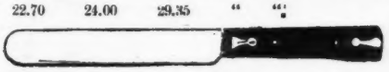
14.70	16.00	18.70	" "	medium size.
17.35	18.70	24.00	" "	full size.



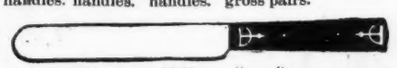
17.35	18.70	21.35	" "	medium.
20.00	21.35	26.70	" "	full size.



22.70	24.00	29.35	" "



Cocobola handles.	Ebony handles.	Bone handles.	
27.35	28.70	36.00	gross pairs.

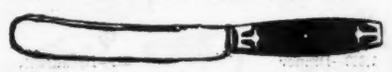


28.00	29.35	38.00	" "

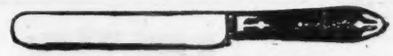
28.65	30.00	38.00	" "

28.65	30.00	38.00	" "

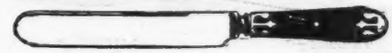
32.00	33.35	38.00	gross pairs.



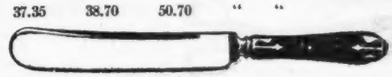
34.70	36.00	48.00	" "



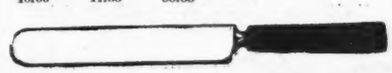
33.35	34.70	46.70	Gross pairs.



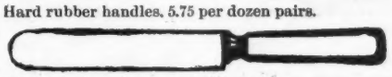
37.35	38.70	50.70	" "



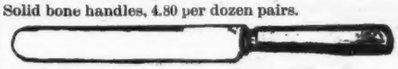
40.00	41.35	53.35	" "



Hard rubber handles, 5.75 per dozen pairs.



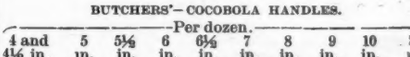
Solid bone handles, 4.80 per dozen pairs.



Celluloid handles, 7.35 per dozen pairs.
Forks are made to match all above patterns, with either three or four prongs.
Discount 25 %.

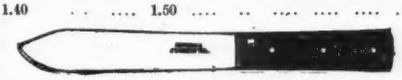
BUTCHERS'—COCOBOLA HANDLES.

	Per dozen.								
4 and 4½ in.	5 in.	5½ in.	6 in.	6½ in.	7 in.	8 in.	9 in.	10 in.	
1.15	....	....	1.20	....	....	....	....	....	....

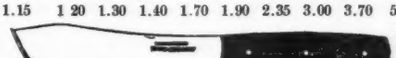


1.40	..	....	1.50	....	..	....	....	....	....

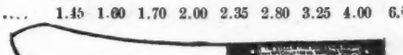
1.15	1.20	1.30	1.40	1.70	1.90	2.35	3.00	3.70	5.35



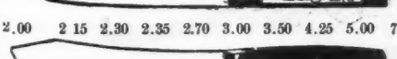
....	1.45	1.60	1.70	2.00	2.35	2.80	3.25	4.00	6.0



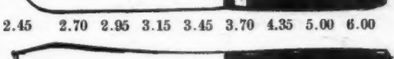
2.00	2.15	2.30	2.35	2.70	3.00	3.50	4.25	5.00	7.50



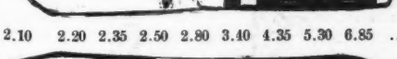
2.45	2.70	2.95	3.15	3.45	3.70	4.35	5.00	6.00	



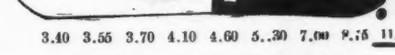
2.10	2.20	2.35	2.50	2.80	3.40	4.35	5.30	6.85	....



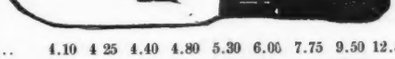
	3.40	3.55	3.70	4.10	4.60	5..30	7.00	9.75	11.00



....	4.10	4 25	4.40	4.80	5.30	6.00	7.75	9.50	12.50



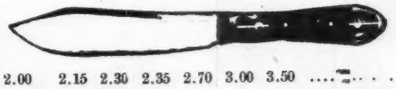
2.00	2.15	2.30	2.35	2.70	3.00	3.50	....	....	....



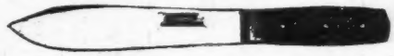
Discount 25 and 10 %.

HUNTING—EBONY HANDLES.

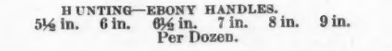
5½ in.	6 in.	6½ in.	7 in.	8 in.	9 in.
Per Dozen.					



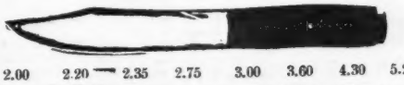
2.00	2.20	2.35	2.75	3.00	3.60	4.30	5.25



2.10	2.20	2.35	2.75	3.00	3.60	4.30	5.25



2.55	2.70	3.00	3.30	3.55	4.00	5.00	6.0



2.55	2.70	3.00	3.30	3.55	4.00	5...	

Discount, 25 and 10 %.
Per Dozen.

Putty knives, cocobola handles..... ..... $1.30@$1.50

SHEARS.

TAILORS'—JAPANNED OR NICKEL HANDLES.

	Per pair.		
12 in	6.00		
12½ in	7.00		
13 in	8.00		
13½ in	9.00		
14 in	10.00		
14½ in	11.00		
15 in	12.00	16 in	14.00

Discount, japanned, 60 %; nickle, 45 %.

BENT TRIMMERS.

Per dozen.			
6 in	13.00	10 in	27.00
7 in	15.00	11 in	30.00
8 in	17.00	12 in	33.00
9 in	22.00		

STRAIGHT TRIMMERS.

Per dozen.			
6 in	12.00	10 in	25.00
7 in	14.00	11 in	30.00
8 in	16.00	12 in	33.00
9 in	19.00		

LADIES' SCISSORS.

Per dozen.			
4½ in	10.00	6 in	11.00
5 in	10.00	6½ in	12.00
5½ in	10.50	7 in	13.00

PAPER AND BANKERS'.

Per dozen.			
9 in	18.00	13 in	36.00
10 in	25.00	14 in	42.00
11 in	27.00	16 in	54.00
12 in	32.00	18 in	20.00

BARBERS—Per dozen.

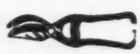
7½ in	15.00	9 in	18.00
8 in	16.00	9½ in	20.0
8½ in	17.00		

SCISSORS.

BUTTON-HOLE.

5 and 5½in., 14 00 per dozen.

Discount, japanned, 70 and 10 % nickel, 60 and 10 %



PRUNING.

1 B., 9 in., 24 per dozen; 2 B. 8¼ in., 21; 3 B., 7¾ in., 9.80.

No. 110, 10 in., $30 per doz.

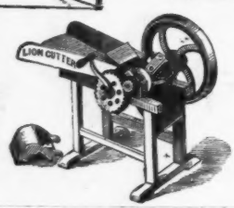
PRUNING SHEARS FOR LONG HANDLES.

No. 1, $36 per dozen; No. $30 per dozen.

Discount, 35%.

Cutters.

FEED.



No. of cutter.	No. of knives.	Length in inches of knives.	Length in inches of feed cut.	Price.
1	2	6¼	⅛, ¾ and 1⅛	$18.00
2	2	7¼	⅛, ¾ and 1⅛	21.00
2½	1	7¼	⅝, ⅞, 1¼ and 1¾	21.00
2½	2	7¼	⅛, ⅞, ⅝ and ⅞	23 00
3	1	8½	⅝, ⅞, 1¼ and 1¾	25.00
3	2	8½	⅛, ⅞, ⅝ and ⅞	27.00
4	1	10	⅝, ⅞, 1¼ and 1¾	30.00
4	2	10	⅛, ⅞, ⅝ and ⅞	33.00
5	2	10	⅛, ⅝, ⅞ and 1¼	35.00
6	2	11	⅛, ¾, 1¼ and 2	45.00
6½	2	11	⅛, ¾, 1¼ and 2	45.00
7	2	13	⅛, ¾, 1¼ and 2	60.00
7½	2	13	⅛, ¾, 1¼ and 2	60.00
10	2	16	⅛, ¾, 1¼ and 2	80.00
12	2	20	⅛, ¾, 1¼ and 2	100.00
11	2	11	⅛, ¾, 1¼ and 2	45.00
13	2	13	⅛, ¾, 1¼ and 2	60.00
16	2	16	⅛, ¾, 1¼ and 2	80.00
0	2	20	⅛, ¾, 1¼ and 2	100.00

The knife arbors for all sizes are made of machinery steel. 30 per cent. dis.

VEGETABLE—GALE'S.

Size.	Weight of Fly Wheel. Pounds.	Will cut per hour. Pounds.	Price
No. 1½	20	1,500	$12
No. 2½	32	1,700	15
No. 3½	32	1,700	15
No. 4	42	2,000	18
No. 5	50	3,000	25
No. 10	65	8,000	35

30% dis.

Drill—Portable Hand Rock.

Price, $225.

Dis., 20%.

Electrical Appliances.

20,000 ohm Testing Generator..... $10.00

Pony Magneto Bell..... 6.00

Standard Magneto Bell 7.50

Standard Extension Bell..... 4.00

Pony Extension Bell..... 3.00

Discount 40 per cent.

Electroplate.

Dis. 60 and 2%.

	Extra plate, per doz.	Double plate, per doz.	Triple plate, per doz.
Oyster forks	7.00	9.00	11.00
Sugar shells	9.00	11.00	13.00
Sugar tongs	25.50	31.50	37.50
Butter knives, twist or reversed handles	10.50	12.50	14.50
Nut picks	4.75	6.00	7.25
Pie knives, engraved blades.	42.00	51.00	60.00
Soup ladles	48.00	60.00	72.00

Aesthetic medium fork.

Tea spoons.	Table spoons.	Medium forks.
7.50	15.00	15.00 per gross.

Discount, 30 and 5 %.

Children's sets *on cards*.	3 pcs.	4 pcs.	
Leader pattern, as per cut	21.00	24.00 doz.	60 and 5 %
Aesthetic pattern, as per cut	5.75	7.25 doz.	30 and 5 %

SPOONS, FORKS, ETC., BEST PLATE ON HARD WHITE METAL

Tipped Tea Spoon.

Oval Tea Spoon.

Perfect Tea Spoon.

Leader Tea Spoon.

	5 oz. or extra plate — Tipd	Oval.	Perfect and Leader.
Tea spoons	4.25	4.50	4.75 per doz
Dessert spoons	7.50	8.00	8.50 " "
Table spoons	8.50	9.00	9.50 " "
Coffee spoons	4.25	4.50	4.75 " "
Dessert forks	7.50	8.00	8.50 " "
Medium forks	8.50	9.00	9.50 " "

Discount, 60 and 5%.

Spoons and forks, German silver, tipped pattern.

Tea spoons.	Table spoons.	Medium forks.
22.50	45.00	45.00 per gross.

Discount, 60 %.

Spoons and forks, made from brass, and silver plated a coating of hard, white nickel.

CASTERS.

1,200—Dinner

232—Breakfast.

Dinner Casters.

No. 1,200. 17½ in. high, $8.00, quadruple plate.
No. 80. 17 in., $6.00, quadruple plate.
No. 140. 16 in., $7.50,
No. 830. 16 in., $5.00, Plain, 50 cents less.
No. 25. 16 in., $4.00, double plate.
No. 33. 16 in., $3.75, " "
No. 53. 15 in., $3.00, " "
No. 15½. 14½ in., $2.00, single plate.
No. 19. 14½ in., $1.85, " "
No. 40. 14 in., $1.75, " "

FLAT WARE.

Calla Lily, Empress, Windsor and Olive Patterns, 18 Per Cent Nickel Silver Base.

PICKLE DISHES.

No. 146.

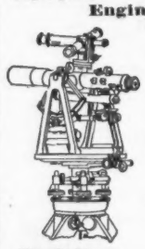
No. 144. 12 in. high, $3.50
No. 66. 10½ in. high, $2; assorted colored glass.
No. 155. 12 in. high, $4; assorted colored glass.
No. 146. 12½ in. high, $9; hand decorated glass.
No. 156. 12½ in. high, $6; hand decorated glass.

No. 255.

TEA SETS.

No. 255. 6 pieces, $35, quadruple plate.
No. 301. 4 pieces, $23, quadruple plate.
No. 1847. 6 pieces, $42, quadruple plate.

Engineering Instruments.



Full Engineer's Standard Transit.

7 in. graduated circle			$255
6 in.	"	"	245
5 in.	"	"	235
4 in.	"	"	225

Standard Engineer's Level, improved centre and seat attachment, 18 in. telescope 140

Plain railroad level, 18 in. telescope..... 125

Explosives.

Dynamite, 75%	Nitro-Glyceine, per lb			.32
" 60%	"	"	"	.25
" 40%	"	"	"	.20
Blasting powder A, per keg 25 lbs				$2.40
" " B, " " "				1.90
Sporting powder, standard brands, per keg 25 lbs				5.00
" " " " "			12½ lbs.	2.75
" " " " "			6¼ lbs.	1.50
" " high grades			6¼ lbs.	3.00
" " "		per can	1 lb	60
" " fancy brands		"	1 lb	1.00

Discounts special for quantity.

Safety fuse, cotton, 12 M ft. in case	$2.85 per M ft.	
" " single tape, 6 M ft. in case	4.25	" "
" " double tape " "	5.40	" "
" " triple tape " "	6.50	" "

Discount 17½%.

Detonating caps, triple force, 25 M. in case	$5.00 per M.
" " quintuple force, 25 M. in case	7.50 per M.

Electrical exploders, 4 ft. wires			$3.00 per 100
" " 6 "			3.54 "
" " 8 "			4.08 "
" " 10 "			4.62 "

Discount 15%. Long lengths to order.

	No.	Capacity.	
Magneto Blasting Machines	1 V.	8 holes	$17.00
" " "	2 V.	20 "	25.00
" " "	3 L.	20 "	25.00
" " "	3 V.	30 "	30.00
" " "	4 V.	60 "	50.00

Discount 15%.

Blasting cables	$5.00 each, discount 40%
" reels	5.00 " " 20%

Flouring Mill Machinery.

20-inch New Era Mill for Wheat, Corn, and Middlings.

Size. Inch.	Power. H. P.	Pulley. Inch.	Capacity Bush.
20	4 to 10	14 × 7	12 to 40

Speed.	Weight. Lbs.	Price.
500 to 800	660	$150

Farm and Plantations Mills.

Diameter of burrs.	Power to drive.	Size of pulley.	Capacity per hour.	Revolutions per minute.	Weight.	Price
	H. P.					
18 in.	2 to 4	9×5½	4 to 14 bushels	600 to 1200	370 lbs.	$100
14 in.	4 to 10	11×6½	8 to 40 bushels	400 to 700	600 lbs.	130

The Dixey Mill—Stiff Spindle Style.

Size.	Power.	Capacity.	Weight.		Pulley.	Iron gear.	Mortise gear.
			Pulley.	Geared			
18	4 to 6H.P.	8 to 25 bu	560 lbs	650	$130	$165	
22	6 to 8 "	12 to 30 "	800 "	1000	165	200	
26	8 to12 "	16 to 40 "	1100 "	1500	185	220	
30	10 to15 "	25 to 60 "	1300 "	1700	215	255	

GRINDING MILLS.

"Daisy," without Shaking Bolt, 170 pounds, 9 cubic feet, $40.

"Daisy," with Shaking Bolt, 185 pounds, 9 cubic feet, $48.

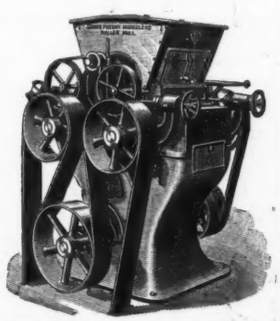
} Discount 25 per cent.

"The Union Mill."

Diameter of Buhr Stones	Size of Pulleys	
	Diam.	Face.
12 in.	8 in.	6¼ in.
16 "	9 "	7½ "

Horse Power	Capacity in B'sh's	Speed	Without Bolt	With Bolt	Sacking Elevator, Extra	Extra Metal Buhrs
8 to 10	12 to 30	1200 to 1500	$90.00	$105.00	$15.00	$1.20 pair
10 to 15	20 to 50	1000 to 1600	160.00	178.00	17.50	1.50 "

Flour Mills.

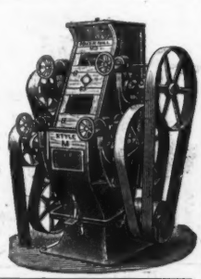


For grinding corn, feed, rye, etc,
Gray's pat. noiseless belt roller-mills, porcelain rolls.

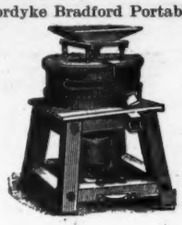
		H. power required.	Price
With corrugated chilled iron rolls.	14" × 16"	5" 7"	2½ $600.00
	14" × 16"	5' 10"	4 900.00
	9" × 14"	5' 1½"	2½ 380.00
With Wegmann's patent porcelain rolls.	9" × 14"	5' 1½"	2½ $600.00
	9" × 14"	5' 1½"	2½ $650.00
Divided four roller machines.	9" × 14"	5' 1½"	2½ $590.00
	9" × 14"	5' 1½"	2½ 615.00
	9" × 14"	5' 1½"	2½ 625.00

Revolutions per minute.	Width.	Length.	Height.
200 to 300	2" 4"	3' 2"	5' 7"
200 " 300	3' 10"	3' 6"	5' 10"
300 " 400	3' 10"	3' 10"	5' 1½"
300 to 400	3' 10"	3' 10"	5' 1½"
300 to 400	3' 10"	3' 10"	5' 1½"
300 to 400	3' 10"	3' 10"	5' 1½"
300 to 400	3' 10"	3' 10"	5' 1½"
300 to 400	3' 10"	3' 10"	5' 1½"

Size.	Height.	Width.	Length.
6" × 12"...	4' 6"	3' 5"	2' 7"
9" × 14"...	5' 8"	3' 10"	3' 5'
9" × 18"...	5' 8"	4' 9"	3' 5'
9" × 24"...	5' 8'	5' 6"	3'



The Nordyke Bradford Portable Mill.



Size of stones, In.	Grinding capacity. Corn, bu. per hour.	Grinding capacity. Wheat bu. per hour.	Horse-power.	Weights. Sing'l gear.	Weights. Double gear.	Pulley mill.	Geared mills. Iron wh'ls.	Geared mills. Mortise wh'ls.
18	8 to 10	.....	4	550	625	$130	$165	$180
20	10 to 12	.....	5	600	700	140	175	190
22	12 to 15	.....	5	700	850	160	190	210
24	15 to 18	.....	6	900	1050	175	210	225
26	18 to 20	8 to 10	8	1200	1400	185	225	250
30	20 to 25	10 to 12	10	1500	1700	225	265	290
36	25 to 30	14 to 17	12	1800	2100	315	355	380
42	35 to 40	19 to 21	15	2000	2300	390	435	460

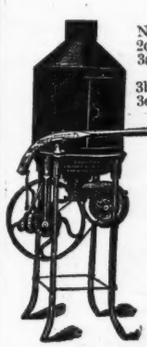
Driving pulley.	Revolutions per minute.	Length of belt above floor.	Approximate shipping weight	Price.
10" × 5¼"	400 to 500	14'	.....	$500.00
14" × 6¼"	350 to 450	18'	2600 lb.	600.00
14" × 7¼"	350 to 450	18'	3050 lb.	650.00
14" × 8¼"	350 to 450	18'	3350 lb.	735.00

Flue Cleaner.
Hurley's Automatic Steam Flue Cleaner.

No.	Outside diam. of tubes.	With hose clamps.	Globe Valves.	Best 4-ply steam hose. Per foot.
1	1⅛ to 2	$5.00	⅛, 95 cents	¾, 67 cents.
2	2 to 2½	6.25	⅛, 95 cents	¾, 67 cents.
3	2½ to 3	7.50	¾, $1.30	¾, 67 cents.
4	3 to 3½	8.75	1, 1.75	1¼, 83 cents.
5	3½ to 4¼	10.00	1¼ 2.90	1¼, $1.04

Dis. on flue cleaners, 60 and 70%.
Dis. on steam hose, 50%, good to 90 lbs steam.

Forges (Portable).



No. 2c, weight, 155 lbs. 21×27 hearth .. $42.00
3a, " 80 " 18 in. diam. hearth..... 27.00
3b, " 75 " 18 " 24.00
3c, " 85 " 18 " 30.00
No. 6a, weight 45 lbs., 14 in. diam. hearth..... 18.00
No. 6B, weight 45 lbs. 14 in. diam. hearth..... 16.00
Dis. 60%.
Light work, 12 × 17; height, 15 in., $16.00.
Same, with Hood, 12 × 17; height, 28 in., $20.00.
Bridge, Boiler or Railroad work, Pan, 17 × 19; height, 29 in.; Fan, 8 in., $27.00.
Same, with Hood, $30.00.
Water Tank, $4.00 extra.
Iron Fire Ring Round Tuyere, $1.00 extra.
50 % dis.

No. 1, 18 in. bellows, $20; No. 2, 20 in. bellows, 25; No. 3, 22 in. bellows, $30.
20% dis.
Stationary.
27 in. bellows, $21; 30 in. bellows, $25; 33 in. bellows, $33; 36 in bellows, $45.
20% dis.

Riveting Forges.
Bellows, 18 in., 20 in., $8.00. $10.00.
22 in., 24 in.' $13.00. $17.00.
20 % dis.

Fruit Evaporator.

No. 1. Evaporator..... $30
No. 2. Fruit Drier and Baker, with Bleacher attachment. Weight, 225 lbs. Capacity, 5 to 7 bushels apples per day; 24 in. deep, 26 in. wide, 5¼ ft. high; 12 trays, 22 × 22; 40 square feet drying surface. Complete..... $50
No. 3. Capacity, 15 to 20 bushels per day..... 100
No. 4. Capacity, 20 to 30 bushels per day..... 160
Dis., No. 1, 3 and 4 = 20%. No. 2 = 30%.
Boxing, extra:
No. 1, $3.00; No. 2, $5.00; No. 3, $7.50; No. 4, $12.50.
Freight to New York:
No. 1, $4.00; No. 2, $6.00; No. 3, $12.00; No. 4, $18.00.

Gaskets.
Corrugated Copper.
Price, 2 cents per square inch, less 30 per cent. discount for home trade.
Less 60% discount for export trade.

Glass Tube Cutters.

One Arm Carries Rotary Cutter Price, $2.50 each.

Glassware.

6-in. bowl and cover, per doz..... $3.25
7-in. " " " 4.50
8-in. " " " 6.00
9-in. " " " 8.00
10-in. " " 10.50
Net.

Nappy, 4½-inch., per doz., 50c.; 6-inch., per doz., $2 nch ., per doz., $3; 8-inch., per doz $4.
Cream Pitcher, 1 pint, per doz., $1.25; one quart, per doz., $3.50; 3 pints, per doz., $4.50.
Pint Pitcher, per doz., $1.50; quart pitcher, per doz., 2; ½ gallon pitcher, per doz., $3; 3 quart pitcher per oz., $4.50.

Flange Butter and Cover, per doz., $1.75.
Water Set, perdoz., sets of 60 pieces, $7.50.

Cheese Dish and Cover, 8 in. per doz., $4.50.
Quart Water Bottle, per doz., $4.50.
Ind. Salts; per gross, $2.00. Assorted patterns.
4 Bottle Castors, per doz., $7.50; 3 bottle, per doz., $4.50.

Berry Dish, 4½-inch , per doz., 50c.; 10-inch, per doz. $4.
Butter Dish and Cover, per doz., $1.25.
Butter Dish and Cover, per doz., 75c.

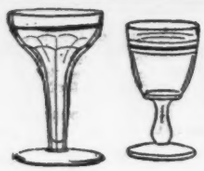
Candlesticks, per doz., $2.00. Glass Slipper for Flowers, per doz., 50 cents; slipper and tray, per doz., $1. Jam Jar and Cover, 1 qt., per doz., $2.50; ½ gal., per doz., $3.25; ¾ gal., per doz., $4; 1 gal., per doz., $5; 1½ gals., $9; 2 gals., per doz., $12. Pocket Flask, 1 pint, $1.

Tumblers. 8 " " 1⅞ oz., per doz., 50 cents
75

9 oz., per doz., $2.75.

11 oz., assorted patterns, per doz., 30 cts.

9½ oz., assorted patterns, per doz., 25 cts.



1 oz. to 12 oz., nested for shipping, per doz. nest, $2.

Goblets, banded, per do . 65 cents.
Claret to match, per doz., 55 cents.
Wines, to match, per doz., 50 cents.
Cordials, to match, per 45 cents.

Banded, open, hollow stem.

Goblets, per doz.,	50	cts.
Claret, "	50	"
Wine "	35	"

Champagne, per doz., $1.25.

½ Pt. tumbler, per doz..55 cts.
½ Pt. mug to match, " ..65 "
Goblet, " " ..50 "
Spoon holder, cream pitcher, sugar butter dish to match.
Sets of 4 pieces, per doz. sets, 48 pieces, $3.75.

Hand Carts

No. 0 42 wheel, in. tread, 1 in. axle-box 48x28x10 deep, $10.50.
No. 1, 36 wheel, 1 in. tread, ⅝ in. axle, box 40x23x10 deep, $9.00.
No. 2, 30 wheel, ¾ in tread, ¾ in. axle, box 32x20x9 deep, $8.25.
With Wagon-Seat Spring.
No. 6, same sizes as

No 0			$12.00
" 7,	same sizes as	No. 1	10.50
" 8,	" " "	No. 2	9.75

With Third Wheel, Without Springs.

No. 3,	same sizes as	No. 0	$12.00
" 4,	" " "	No. 1	10.50
" 5,	" "	No. 2	9.50

Hardware Specialties.

AUGERS.
Patent Adjustable Hollow.
Cuts from ¼ to 1¼, pivoted jaws, graduated scale to 1-16ths, per doz., $60.00
Discount, 15 and 10%.

Patent Hollow Auger.

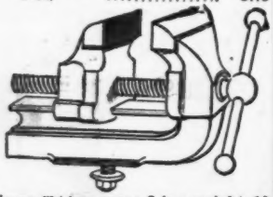
Inch	5-16	⅜	7-16	½
With bits	12.00	12.00	12.00	12.00
Without bits	8.00	8.00	8.00	8.00

9-16	⅝	¾	⅞	1	1⅛
14.00	14.00	14.00	16.00	16.00	20.00
9.00	9.00	9.00	13.00	13.00	14.00

1¼	1⅜	1½
20.00	24.00	24.00
14.00	16.00	15.00

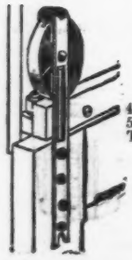
Discount, 15 and 10%.

BENCH DRILL.
Adjustable bed plate.
26½ high drills to ½ in. hole, 3½ run of screw.
List price, each.....$10.00
Net, " 3.75



Bench Vise, Steel Jaws, 3½ in., opens 3 in.; weight, 12 lbs. List price, each, $4.00.; net price, each, $1.60.

BENCH HOOK.
Patent, adjustable and reversible.
List $9 dozen, ½ dozen in box.
Discount, 20 and 10%.



BARN DOOR HANGER.

4 in., per doz. pairs			$12.00
5 " " "			14.40
Track, per foot			.08

One dozen pairs in case.
Dis., 50%.

BLACKSMITH'S TONGS.
Swivel Jaw.

No. 1, 16 in., per doz		$10.00
" 2, 18 "		10.00

Dis. 20%.

CASTERS.
Swivel Store Truck

No. 20,	japanned, 4 in. wheel, each		.55
No. 25,	" 5 " " "		.75

Noiseless turned wheel.

No. 30,	japanned, 4 in. wheel, each		1.30
No. 35,	" 5 " " "		1.60

Discount, 25%.

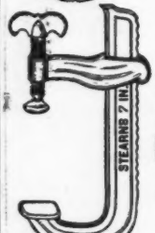
CLOTHES REEL.
Extra heavy, gray iron, japanned.
List per doz.....$15.00
Net " 7.00

JACK SCREWS.
New pattern wrought iron screw.

No.	Rise of screw.	High.	Diameter screw.	Price.
20	4⅛ in.	10 in.	2 in.	$4.50
25	6½ "	12 "	2 "	5.25
30	8½ "	14 "	2 "	5.75
35	11½ "	16 "	2 "	6.50

Discount, 40%.

Store Truck, stationary.
No. 50, 5-inch wheel, 1½ inch wide each, $1.05.
No. 60, 5-inch, extra heavy, 1½ inch wide, each $1.50.
Discount, 25%.

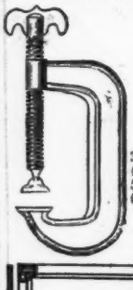


SCREW CLAMPS.
Adjustable.

3 in., per doz		$4.00
5 " "		6.50
7 " "		9.00
9 " "		10.50
12 " "		15.00
16 " "		20.00

½ doz. in box.
Discount, 20 and 10%.

CLAMPS.
New Door Frame.
3 ft. long, per doz., $3 list; $5 per doz. net.



Malleable Iron Screw Clamps.

	Per Doz.		Per Doz.
3 in	$7.00	7 in	$20.00
4 "	10.00	8 "	25.00
5 "	12.00	9 "	27.50
6 "	16.00	10 "	30.00

3, 4, 5, 6 in., ½ doz. in box.
Dis., 70%.

WINDOW SCREEN FRAMES.
Patent Japanned Corners.
No. 25, 36 by 36 corners and screws, without bead, per doz., $2.50.
No. 25, 36 by 36 corners and screws, with bead, per doz., $2.90.
No. 35, 42 by 42 corners and screws, without bead, per doz., $2.90.
No. 35, 42 by 42 corners and screws, with bead, per doz., $3.30.
Black satin stain, sticks ⅞ by 1 in.
Dis., 20%.

PULLEYS.
Side, No. 45, Japanned.

Inches	1	1½	2	2½	3	4	5
Per doz.	.90	1.00	1.60	2.40	3.50	9.00	15.00

2 inch and under, 2 dozen in box: 2½, 3 and 4, 1 dozen in box; 5 inch, ½ dozen in box.
Discount, 50%.

HAY FORK PULLEY.
New pattern.

No. 15,	5 in. iron wheel	per doz.	$4.50
25,	5 in. wood "	"	4.50
66,	6 in. " "	"	6.00

4 dozen in case, 8 dozen in barrel.
No. 15, per dozen, $2 net.

PULLEY HOOK (New Floor.)
Deep cut thread, forged point.

	Per doz.
¾ in. wrought iron, 8 in. long, list	$1.90
net	1.00

WELL WHEEL.
New pattern.
Japanned.

In.	8	10	12	14	16
Pr.d.	7.00	9.50	12.50	20.00	30.00

Discount, 70%.

SHEAVES.
Patent Common
Turned and polished iron wheels, round corners, brass pin, one set in box.

2½ inch	$1.50
3 "	1.60
4 "	2.00
5 "	2.60

Discount, 50%.

SINKS.
All 6 inch deep.

14 × 20 in	$1.50	18 × 30 in	$2.50
15 × 25 in	1.75	18 × 32 in	3.00
15 × 27 in	2.00	18 × 36 in	3.00
16 × 24 in	1.80	20 × 30 in	3.00
16 × 28 in	2.10	20 × 36 in	3.70
17 × 30 in	2.25	20 × 40 in	4.00
18 × 24 in	2.10		

Discount, 60%.

SPOKE POINTERS.

Per doz.
No. 1, points 1⅜ in. diameter, $9.00
No. 2, points 2⅝ in. diameter, $15.00
Discount, 15 and 10%.
⅛ dozen in box.

VISE.
(Bench Vise, Steel Jaws.)
3½ in. opens 5 in., weight 12 lbs.
List price, each.$4.00
Net " " .. 1.60

Silent Saw Vise.
No. 10., 10 in. jaw, per doz....$15.00
Dis., 33⅓%.

No.	per dz.	gr., lbs.	per No. Clamp.	per dz.	gr., lbs.
1	Amateur vise...$2.25	70	1½	3.00	80
			2½	5.00	220
Anvil.			3½	14.25	700
2	3.75	200	4½	21.00	1,425
3	11.25	615	Combination		
4	18.00	1,350	hand	5.25	85
10	24.00	1,675			

Spot cash discount, 33, 20 and 2, f.o.b.

Nos. 1, 1½, 2 and 2½ are packed in dozens; Nos. 3 and 3½ in half dozens; Nos. 4, 4½ and 10 in quarter dozens, and No. 20 singly. Each hand vise is put up in neat box and packed in half dozen lots.

1 Hinge pipe vise, 0 to 2 in. pipe	Each $10.00
2 " " " 0 to 4 in. pipe	20.00
1 Malleable pipe vise, 0 to 2 in. pipe	8.00
1 Combination pipe and bench vise, 0 to 2 in. pipe	16.00

Discount, 50%.

WRENCHES.
Coes' Knife Handle Wrenches.

BLACK.

Size.	₱ doz.	Size.	₱ do	₱ doz.
6 inch	$9.00	10 "	12.00	15 inch 24.00
8 "	10.00	12 "	14.00	18 " 30.00
		21 inch	36.00	

BRIGHT.

4 inch	$10.00	10 inch	14.00	18 inch	32.00
6 "	10.00	12 "	16.00	21 "	38.00
8 "	11.00	15 "	26.00		

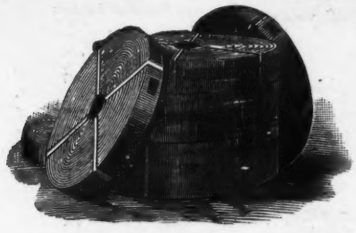
Discount, 50, 10, 7½ and 3%.
Coes Mechanics' Screw Wrenches, same list, less 50 10, 10, 7½ and 3%.
A. G. Coes & Co. Pat. Screw Wrenches, same list as above. Discount, 50, 10, 7½ and 3%.

Ice Machines (Family).

No. 1, Ice machine, ice and ice cream molds, 1 lb. ice, $15.00.
No. 2, Ice machine, ice and ice cream molds, 1½ lbs. ice, $20.00.
No. 3, Ice machine, ice and ice cream molds, 1 carafe 1 bottle holder, 2 lbs ice, $26.50.
No. 4, Ice machine, ice and ice cream molds, 2 carafe 1 bottle holder, 4 lbs. ice, $33.00.
No. 5, Ice machine, ice and ice cream molds, 3 carafe 1 bottle holder, 6 lbs. ice, $40.00.
No. 6, Ice machine, ice and ice cream molds, 4 carafe, 1 bottle holder, 9 lbs. ice, $46.50.

India Rubber Goods.

MECHANICAL.

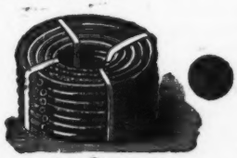


RUBBER BELTING.

Inches.	2 ply per foot.	3 ply per foot.	4 ply per foot.	5 ply per foot.	6 ply per foot.
1	$0.07	.....	.....	.....	.....
1¼	0.09	.....	.....	.....	.....
1½	0.11	.....	.....	.....	.....
2	0.15	$0.17	$0.21	.....	.....
2½	0.18	0.22	0.26	.....	.....
3	0.22	0.26	0.31	.....	.....
3½	0.26	0.30	0.37	.....	.....
4	0.30	0.34	0.42	.....	.....
4½	0.33	0.39	0.47	.....	.....
5	0.36	0.43	0.52	.....	.....
6	0.43	0.52	0.62	.....	.....
7	0.51	0.60	0.73	.....	.....
8	0.59	0.70	0.84	$1.05	$1.25
9	0.67	0.80	0.95	1.18	1.42
10	0.75	0.90	1.07	1.33	1.60
11	0.83	1.00	1.18	1.47	1.77
12	0.91	1.08	1.30	1.62	1.95
13	1.00	1.18	1.42	1.77	2.13
14	1.08	1.28	1.54	1.92	2.31
15	1.16	1.38	1.66	2.07	2.49
16	1.25	1.50	1.78	2.22	2.67
18	1.41	1.70	2.02	2.52	3.03
20	1.58	1.90	2.26	2.82	3.39
22	1.76	2.12	2.52	3.15	3.74
24	1.96	2.36	2.80	3.50	4.20
26	2.18	2.60	3.08	3.85	4.62
28	2.42	2.84	3.36	4.20	5.04
30	.....	.....	3.64	4.55	5.46
32	.....	.....	3.92	4.90	5.88
34	.....	.....	4.20	5.25	6.30
36	.....	.....	4.48	5.60	6.72
38	.....	.....	4.76	5.95	7.14
40	.....	.....	5.04	6.30	7.56
42	.....	.....	5.32	6.65	7.98
44	.....	.....	5.60	7.00	8.40
46	.....	.....	5.88	7.35	8.82
48	.....	.....	6.16	7.70	9.24
50	.....	.....	6.44	8.05	9.66
52	.....	.....	6.72	8.40	10.08

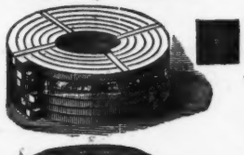
Dis. Reliance, 60 and 5. Dis. Royal, 60, 10 and 10. Dis Manhattan, 70 and 5. See Leather Belting, page 3; Link Belting, page 9.

PACKING.



Piston Packing.

Round Piston Packing Per lb. 85c. Discount, 60, 10 and 5 per cent.



Square Piston Packing.

Price same as above. Round and square piston packing is made in lengths of twelve or twenty-four feet.

Square Piston Packing. Rubber back, per pound $1. Discount 60 per cent. Best only.

Square piston packing rubber back is made in lengths of twenty feet.

Steam Packing.
Cloth Insertion, Rubber Outside.
Cloth Insertion, Cloth on one or both sides.

Thickness.	1-Ply.	2-Ply.	3-Ply.	4-Ply.
1-64 inch	70 cts.	.....	.....	.....
1-32 "	65 cts.	.....	.....	.....
1-16 "	60 cts.	63 cts.	66 cts.	.....
3-32 "	55 cts.	58 cts.	61 cts.	.....
1-8 "	55 cts.	55 cts.	58 cts.	61 cts.
3-16 "	55 cts.	55 cts.	55 cts.	58 cts.
1-4 "	55 cts.	55 cts.	55 cts.	55 cts.

One-ply of cloth to every 1-16 inch thickness.
Three cents per pound additional will be charged for each extra ply of cloth. Each cloth, whether insertion or on outside, to count as one ply.
All cloth insertion or plain packing is one yard wide, and any length desired.
Wire insertion packing, all thicknesses, per lb, 50 cents.
Discounts: Reliance, 70 & 10; Royal, 60, 10 & 10; Manhattan, 60 per cent.

HOSE.

Improved "Smooth Bore" Rubber Suction Hose.
On spiral flat or round tinned steel wire.

Int. Diam.	Per ft.	Int. Diam.	Per ft.
2 inch	$2.60	7 inch	$13.50
2½ "	3.50	7½ "	15.00
3 "	4.00	8 "	16.50
3½ "	5.50	9 "	19.50
4 inch	6.50	10 "	22.50
4½ "	7.50	12 "	27.50
5 "	8.50		
5½ "	9.50		
6 "	10.50		
6½ "	12.00		

Suction hose discount: Reliance, 50 and 10%; Royal, 60, 10 and 5%; Manhattan, 70 and 5%.

SUCTION HOSE.

On spiralbrass or iron wire

Int. Diam.	Per. ft.
¾ inch	$ .77
1 "	1.00
1¼ "	1.25
1½ "	1.65
1¾ "	2.10
2 "	2.50

RUBBER HOSE.
Conducting Hose—Two-ply.

Int. diam.	Per ft.	Int. diam.	Per ft.	Int. diam.	Per ft.
½ in	$0.20	2 in	$0.66	5 in	$1.65
¾ in	25	2¼ in	75	6 in	1.98
1 in	33	2½ in	83	7 in	2.31
1¼ in	42	2¾ in	92	8 in	2.64
1½ in	50	3 in	99	9 in	2.97
1¾ in	58	4 in	1.32	10 in	3.33

HYDRANT HOSE—THREE-PLY.

½ in	$0.25	1½ in	$0.60	2½ in	$1.00
¾ in	30	1¾ in	70	2¾ in	1.10
1 in	40	2 in	80	3 in	1.20
1¼ in	60	2¼ in	90	3½ in	1.40
				4 in	1.60

Discount—Reliance, 60; Royal, 70; Manhattan, 70 and 10 per cent.

GASKETS AND RINGS.

Fibrous.
⅛ inch thick, or less, per lb $0.90
5-32 inch thick, and upwards, per lb $0.80
Cloth Insertion.
1-16 inch thick, or less, per lb $1.25
3-32 inch thick, and upwards, per lb $1.00
There is one ply of cloth to every 1-16 in thickness.
Five cents per pound additional for each extra ply of cloth. Dis., 60, 10 and 5%.

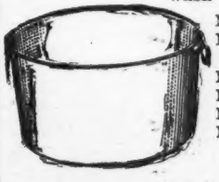
CORRUGATED RUBBER MATTING.
Rolls 1 yard wide, 30 yards long, cut to any size required.

Indurated Fibre Ware.

SPITTOONS.

	Doz.
16 in. dia., 8 in. high	$24.00
12½ in. dia., 5½ in. high	10.80
9 in. dia., 5 in. high	7.80

WASH TUBS.



No. 0, 23 in	⅛	12	27.00
Nos. 0, 1, 2 and 3, nested	1	n. 3½	22.50
No. 1, 21 in	⅛	10½	24.00
No. 2, 19½ in	⅛	9	21.00
No. 3, 18½ in	⅛	9	18.00
Nos. 1, 2, and 3, nested	⅛	9¾	21.00

CHAMBER PAILS.
12 in. dia., 9 in. deep, 3 gal, ... 16.00

WATER COOLERS.

	Doz.
3 gal	$32.00
4 "	40.00
5 "	44.00
6 "	48.00
8 "	64.00
10 "	80.00
12 "	96.00
15 "	120.00

WATER COOLERS AND FILTERS.

	Doz.
4 gal	$96.00
5 "	108.00
6 "	120.00
8 "	144.00
10 "	192.00
15 "	288.00

Dis. on all 25 and 20%.

Pails.

	No. doz. in crate.	Cubic feet.	Price per doz.
Ladies' or Weaver's pails, 6 qt	1	2¾	$5.35
Half or buggy pails, 6 qt	1	3	4.80
Star pails (standard plain), 12 qt., stenciled "for fire only" without extra charge	1	3½	6.00
Deck or Mason's pails (same size as Star, but heavier, with heavy wire bail)	1	4	6.60
Railroad or fire pails, 14 qt. (also stenciled "fire" without extra charge)	½	3½	7.80
Fire pails, round bottoms	1	4	7.80
Milk pails, 14 qt	1	4	7.80
Stable pails, flush bottom, heavy wire bail, 14 qt	1	4	7.80
Stable pails, 16 qt., same as above	½	3½	8.40
" 18 " "	½	3¾	10.70
" 20 " "	½	4	12.00
Covers for fire or star pails	1		3.35

KEELERS.

		Doz
A—20 in.	7 in. deep	16.20
B—19 "	" "	15.00
C—18½ "	" "	14.00
1—17½ "	" "	13.20
2—15½ "	6 in. "	12.00
3—13½ "	5 in. "	10.20
4—12 "	4 in. "	9.00

MILK OR VEGETABLE PANS.
13½ in. dia 3¼ in. deep, 6 quarts, $3.60 per doz.

WASH BASINS.

	Doz.
12¼ in	$4.80
12½ in	4.20
11½ in	3.60

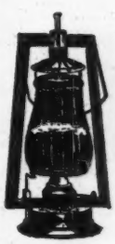
Lamps.

Drummond Electric Hanging Lamp, 300 candle power, complete, each $3.50.
The electric lamp, 60 candle-power.
With decorated shades, nickel, per doz. $22.00
With opal plain shades, nickel, per doz. 18.00.
With decorated shades, brass, per doz. 21.00.
With opal plain shades, brass, per doz. 17.00.
Lamp chimney patent for Sun burners.

Per doz. No. 0, 50 cents. No. 1, 60c. No. 2, 75c.
Hitchcock nickel table lamp (No. 654), each $3.25
" " hanging " 656 " 7.25
" " bracket " 651 " 3.50
" " " with reflector 653 " 3.75
" French bronze bracket, with reflector, No 653, each $3.75.

Miners'.
Brass, Collar and Breast in one piece, Spout and Body in one piece.
Price, $9 per gross net.

	Doz.
Demmler Bros.	
"Cherry" Miners' Lamps, double spout	$2.00
" Drivers' " " "	2.7
" " " single "	2.5



Harp, complete, with square tin shade, per doz., $2.50.
Complete, with Burner and chimney, per doz., $1.50.
Hurricane lanterns 25 cents extra with guards.
875, ¾ wick, without guards, per doz., $5.00.
876, square safety lifting globe, per doz., $5.50.
877, ¾ wick, safety lifting globe, per doz., $6.75.
Nickel plated diamond reflector reading lamp, 30 candle-power, $13.50 per doz.
Net.
Illuminated night clock, per doz., $27.

PAPER LAMPS.
Lined with oil proof composition.

	No. 0.	No. 1.	No. 2.
Height,	2⅛ in.	3 in.	3¾ in.
Diameter,	3¼ in.	2¾ in.	2½ in.
Weight,	¾ doz.,	3¾ lbs.	1¾ lbs.
Price,	$2.75 per doz.	$2.25	$2.75
	No. 0.	No. 3.	No. 4.
Height,	2¾ in.	5 in.	6¼ in.
Diameter,	3¼ in.	3½ in.	4 in.
Weight,	¾ doz.,	3¾ lbs.	3½ lbs.	7 lbs.
Price,	$2.75 per doz.	$3.25	$4.50

Dis., 20%.

Laundry Appliances.

Washing Machine.

THE CATARACT.

All Metal.

Cubic Measurement 15 ft.

Price $20.

Rolls.

"Volunteer." Length, 10 in. x 1¾ in. dia. $40 doz.

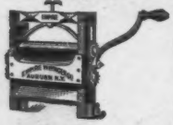
"Volunteer." Length 11 in. x 1¾ in. dia. $50 per doz.

"Volunteer." Length 12 in. x 1¾ in. dia. $60 per doz. Dis., 40%.

"Volunteer." Two independent pressure screws,

"Daisy." Length, 10 in. x 1¾ in. dia. $30 per doz.

"Daisy." Length, 12 in. x 1¾ in. dia. $18 per doz. Dis., 40%.



"Empire." Length, 10 in. x 1¾ in. dia. $63 per doz.
"Empire." Length, 11 in. x 1¾ in dia. $74 per doz.
"Empire." Length, 12 in. x 1⅞ in. dia. $84 per doz.
"Empire." Length, 12 in. x 1⅞ in. dia. $87 per doz.
"Empire." Length, 14 in. x 2¼ in. dia. $156 per doz.
"Empire." Length, 14 in. x 2¼ with pulleys. $220 per doz.
"Empire." Length, 16 in. x 2½ with pulleys. $360 per doz. Dis., 40%.

EMPIRE CLOTHES DRYING BARS. $10 per doz. Dis., 40%.

Closed.

Open for use.

Lawn Mowers.

	In.	Lbs.		In.	Lbs.	
0	Weight,	30¾	$13.00	16	Weight,	38	$19.00
2	"	31½	15.00	18	"	41	21.00
4	"	36	17.00	21			34.00

Dis. 60 and 5%.

10 in.	12 in.	14 in.
$13.00	$15.00	$17.00
16 in.	18 in.	20 in.
$19.00	$21.00	$23.00

24 in., $30.00.
Geared at both ends.
Dis. 60 and 5 and 5%.

10 in. Croquet, 18 pound, mower..... $11.00
10 in..... 13.00
12 in..... 15.00
14 in..... 17.00
16 in..... 19.00
18 in..... 21.00
20 in..... 23.00

Dis., 60 and 5% and 5% cash 30 days, f.o.b. New York.

New Excelsior Horse Lawn Mower.

25 in. cut,	without shafts or seat	$85.00
30 "	with shaft and seat	110.00
5 "	" " " "	135.00
0 "	" " " "	170.00
Horse boots, per set		12.00

Dis. 50%.

Excelsior Three-Blade Mower and Roller.

8 in., $11.00; 10 in., $13.00; 12 in., $15.00; 14 in., $17.00; 16 in., $19.00; 18 in., $21.00; 20 in., $23.00.

Dis. 60% and 5% cash 30 days f.o.b. New York.

Link Belting.

Price per running foot, net.

No.	Price.	No.	Price
25	$0.13	78	$0.40
32	.13	85	.45
33	.12	85	.50
34	.13	88	.50
35	.14	95	.60
42	.16	103	.75
45	.16	105	.70
51	.20	106	.90
52	.25	107	.80
55	.22	108	.80
57	.24	109	.90
62	.30	114	1.10
63	.30	122	1.50
67	.30	124	1.30
75	.35	146	1.40
77	.35		

Sprocket wheels..... 25%

Locks.

YALE PATENT.
RIM STORE LATCH.

	Per doz.
3 × 5 in., 4 keys	$48.00
2½ × 4 in., 3 keys	39.00

RIM NIGHT LATCH.

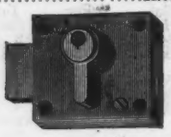
Spring lock, 3 keys	18.00
Dead lock, 3 keys	25.00

NIGHT LATCH.

Escutcheon	39.00
"	36.00

MORTISE DEAD LOCK.

4½ × 3½	45.00
2¾ × 3½	24.00

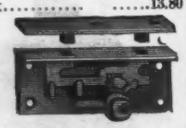


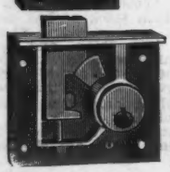
CUPBOARD LOCKS.

Plated Nose	13.20
Brass Nose	12.00

CUPBOARD

Dead Lock	10.80
Spring Lock	13.80



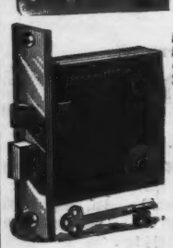


CHEST LOCKS.

Plated nose	19.20
Brass "	18.00

DRAWER LOCK.

Plated nose	10.20
Brass "	9.00



KNOB LOCKS.

5 × 3⅜	22.50
5 × 3⅜	20.00
4¼ × 3⅜	13.25
3½ × 3⅜ "	10.50

STANDARD LATCHES.
Dead locks.

3¾ × 2¾	24.00
2½ × 3½	14.00
1¾ × 2¾	12.00

NIGHT LATCHES.

3¼ × 3½	20.00
2½ × 3½	18.00

DRAWER LOCKS.
2 × 1⅝, two tumblers.

Plated nose	7.50
Brass "	6.00

Three tumblers.

Plated nose	9.00
Brass "	7.50

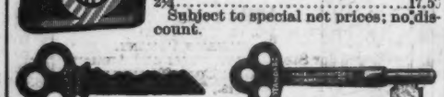
RIM FLUSH DRAWER LOCK.
2 in. diameter.

	2 tumblers.	3 tumblers.
Plated nose	7.50	9.00
Brass "	6.00	7.50

BRONZE SPRING PADLOCK.
2 flat steel keys.

In.	
1	11.00
1¼	12.00
1½	13.50
1¾	14.50
2	16.00
2¼	17.50

Subject to special net prices; no discount.



YALE KEYS.

Machinery—Foot Power.

Engine Lathes

8 in. swing, 20 in. bet. centers, 36 in. bed, 240 lbs. weight, $60.
8 in. swing, 30 in. bet. centers, 46 in. bed, 260 lbs. weight, $70.
8 in. swing, 36 in. bet. centers, 52 in. bed, 280 lbs. weight, $75.

Boxing for export, $2.50 extra; f.o.b. at Cincinnati, 25 ⅌ dis.

SAWS AND LATHES

Victor Scroll Saw, Cuts to 3 Inches.

24-inch swing, with 12 saw blades.... $4
Dis., 20%.

Empire Scroll Saw, Cuts to 3 Inches.

24-in. swing, drill and tilting table.
Price, boxed..... $25
Dis., 20%

The Acme Combination Saw.

Hand or steam power.
Adjustable table and gauges.

Price, boxed	$40
Scroll saw attachment	7
Boring attachment	10
Moulding attachment	10

Dis., 20%.

Paragon Self Feed Rip Saw.

Two changes of speed; three changes of feed.
Price, with one 10 in. saw, $50.00
Dis., 20%.

Diamond Mortising Machine.

With mortise ¼ to 1 in. wide, 3 in. deep.
" cut tenons ⅛ to ¾ thick, 3 in. wide.
Price, with 3 chisels..... $25.00
Dis., 20%

The "Star" Lathe.

Swings 9 × 25 in., back geared screw cutting.
Feeds in or out, right or left. Adjustable Tail Stock for Tapers.
Price..... $75.00
Dis., 15%.

The Crown Lathe.

Swings 10 × 36 in.

Price, boxed	$45.00
Compound slide rest	15.00
Countershaft	10.00

Dis., 20%.

Rival Scroll Saw, with six extra saw blades, twist drill and wrench.

Price	$10.00
Lathe attachment	$3.00

Dis., 25%.

The Challenge Scroll Saw, for shell, bone wood, or metal.
Nickel Plated, with six extra saws, twist drill and wrench.
Boxed..... $20.00
With lathe attachment..... $5.00
Dis., 25%.

Hand Circular Rip Saw.

Cuts 3¾ thick, 19 in. wide.

Price $50.00.

Dis.,

Scroll and Circular saw Combined. Combined Machines.

Combined circular scroll saw and boring attachment—2 circular saws, 12 assorted scroll saws, boring attachment, and self-centering drill chuck..... $50.00
Combined circular and scroll saw—2 circular and 12 scroll saws..... 40.00
Circular saw—1 extra rip and 1 cross-cut saw..... 35.00
Scroll saw—12 assorted scroll saws..... 32.00
Counter shaft for steam power..... 10.00
Dis., 35%.

Foot Power Former.
$20.00; Knives extra, $1.00 each.
Dis., 35%.

Mortising Machine.
$22.00; Chisels, $1.00 each.
Dis., 35%.

Blind Slat Chisels, 3 set bits, $5.00.
Dis., 20%.

Tenoning Machine,
Price, $25.
Dis., 35%.

Velocipede Scroll Saw,

Without boring attachment..... .....$20.00
With " " 23.00

1 doz. saw blades, 1 3-16 bit. } Included. Dis., 35%.

Lathe.

centres, 1 spur, 2 tool rests and sockets, 1 turned face-plate, $35.
Dis., 30%.

Lathe.

One turned face-plate, two pointed and one spur center, two rests, with sockets and plate for hand tools, slide rest-wrench, belting, etc., $40.
Dis., 25%.

Meat Cutters.

	American.				Enterprise.				
	1	2	3	4	10	12	22	32	42
each,	$5.00	7.00	10.00	25.00	$3.00	2.50	4.00	6.00	15.00
	Dis., — —.				Dis., 30%.				

Motors (Water).

Size No. 8, for Sewing Machines, etc., $18 each.

No. 9, ⅛ horse-power (30 lbs. pressure), ¼ h. p. (50 lbs.), ½ h. p. (100 lbs.), ¾ h. p. (150 lbs.), 1 h. p. (200 lbs.), $50.

No. 10, ¼ horse-power (30 lbs. pressure), ½ h. p. (50 lbs.), 1 h. p. (100 lbs.), 1½ h. p. (150 lbs.), 2 h. p. (200 lbs.), $50.

No. 10½, ⅛ horse-power (30 lbs. pressure), 1 h. p. (50 lbs), 2 h. p. (100 lbs.), 3 h. p. (150 lbs.), 4 h. p. (200 lbs.), $75.

No. 11, 1 horse-power (30 lbs. pressure), 1½ h. p. (50 lbs.), 3 h. p. (100 lbs.), 4½ h. p. (150 lbs.), 6 h. p. (200 lbs.), $100.

No. 12, 2 horse-power (30 lbs. pressure), 3 h. p. (50 lbs.), 6 h. p. (100 lbs.), 9 h. p. (150 lbs.), 12 h. p. (200 lbs.), $175.

No. 13, 3 horse-power (30 lbs. pressure), 5 h. p. (50 lbs.), 10 h. p. (100 lbs.), 15 h. p. (150 lbs.), 20 h. p. (200 lbs.), $285.
Dis., 40%.

Governors for 11 and 12, $25 extra; for No. 13, $35 extra.

Concentrating Machinery.

Blake Improved Crusher: 10x7, weight 7,500; $410.00.

Blake Improved Crusher: 15x9, weight 9,000; $580.00.
Discount 25%.

Cornish Crushing Rollers: 20 diameter, 10 face, weight 5,400; $450.00.

Cornish Crushing Rollers: 20 diameter, 14 face, weight 6,000; $500.00.

Cornish Crushing Rollers: 22 diameter, 14 face, weight 2,500; $625.00.

Cornish Crushing Rollers: 27 diameter, 14 face, weight 13,000; $750.00.

Cornish Crushing Rollers: 30 diameter, 14 face, weight 15,000; $850.00.
Discount 25%.

Complete Sizing Arrangement, consisting of Revolving Screens of Steel Sheet and Hydraulic Classifier.

For Concentrator, 25 tons capacity, $250; 50 tons capacity, $350; 75 tons capacity, $450; 100 tons capacity, $800. Discount, 10 per cent.

Automatic working Jig Machines, all complete, woodword included, with slidemotion: 2 sieves, $310; 3 sieves, $360; 4 sieves, $450.

With Eccentric Motion, all complete, woodwork included: 1 sieves, $200; 2 sieves, $270; 3 sieves, $320; 4 sieves, $330.

Automatic working Double Jig Machines, all complete, woodwork included; 4 sieves, $210; 6 sieves, $335; 8 sieves, $425. Discount, 25 per cent.

Single Rittinger Percussion Tables, all the iron parts, $350; Double Rittinger Percussion Tables, all the iron parts, $500. Discount, 10 per cent.

Improved Rotary Tables, all the iron parts and pipes, $300. Discount, 25 per cent.

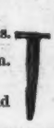
Nails and Tacks.

Swedes. Tacks.

Per doz.	¼	⅜	1	1½	2	2½	3	
½ wt.	35	40	46	50	55	60	65	75
6	8	10	12	14	16	18	20	24 oz.
85	1.00	1.20	1.40	1.60	1.75	1.85	2.15	2.55
Doz. full wt.	¼	⅜	1	1½	2	2½	3	4
	60	70	80	90	1.00	1.10	1.20	1.40
6	8	10	12	14	16	18	20	24 oz.
1.60	1.90	2.30	2.70	3.10	3.40	3.80	4.20	5.00
lb., bulk	¼	⅜	1	1½	2	2½	3	4
or paper	1.00	1.25	1.00	80	66	58	52	46
6	8	10	12	14	16	18	20	24
36	32	31	30	29	28	28	28	28

Discount, 67½, 10 and 2%.

O. H. Swedes.
Price, same as Swedes.
Swedes steel tacks same list price as iron.



Upholsterers.
Price, same as Swedes.

Discounts, 72½, 10 and 2%.

Cut Tacks. Price per dozen ounces.

	1	1½	2	2½	3	4	6	8	10
¼ wt.	..	..	..	..	35	40	45	50	55
	12	14	16	18	20				
	60	70	80	90	1.00				
½ wt.	1	1½	2	2½	3	4	6	8	10
	45	50	50	55	60	65	70	80	95
	12	14	16	18	20				
	1.10	1.25	1.40	1.55	1.70				
Full wt.	1	1½	2	2½	3	4	6	8	
	80	80	90	1.00	1.10	1.20	1.30	1.50	
	10	12	14	16	18	20			
	1.80	2.10	2.40	2.70	3.00	3.30			

Discount, 70, 10 and 2%.

Carpet Tacks, flat and oval heads.

Blued, doz. oz.	4	6	8	10	12	14	16	18	20	
¼ wt.	35	40	45	50	55	65	75	85	95	
	22	24								
	1.05	1.15								
" ⅛ wt.	4	6	8	10	12	14	16			
	65	70	80	95	1.10	1.25	1.40			
	18	20	22	24						
	1.55	1.70	1.85	2.00						
Tinned, doz. ¼ wt.	4	6	8	10	12	14	16			
	50	55	60	75	85	1.00	1.10			
	18	20	22	24						
	1.20	1.35	1.45	1.60						
Tinned, doz. ⅛ wt.	4	6	8	10	12	14				
	95	1.05	1.15	1.40	1.60	1.85				
	16	18	20	22	24					
	2.10	2.35	2.60	2.85	3.10					

Discount, 72½, 10 and 2%.

Finishing Nails.

Inch.	⅝	3½-8	4-8	4½-8	5/8	5½-8	6-8	7-8	1
Per lb.	48	40	32	28	26	24	22	20	18
	1½ and larger.								
	16								

Discount, 60, 10 and 2%.

Chair Nails.

Doz. ⅛ wt.; doz. full wt.; pound B. or P.

Inch.	⅜	3½-8	4-8	4½-8	5/8	5½-8	6-8	7-8
Per lb.	51	43	35	31	29	27	25	23
	1	1½						
	21	19						

Discount, 60, 10 and 2%.

Common and patent brads.

inch.	Price per doz. ⅛ wt.	Price per doz. full wt.	Price per lb. in papers or bulk.
2-8	.50	1.00	1.25
3-8	.60	1.20	.80
4-8	.66	1.30	.58
5-8	.72	1.44	.48
6-8	.80	1.60	.36
7-8	.90	1.80	.30
1	1.00	2.00	.26
1½	1.12	2.24	.25
1¼	1.26	2.52	.24
1½	1.82	3.64	.22
1¾	2.25	4.50	.20
2	2.43	4.86	.18

Dis. 60, 10 and 2%.

Oils.

LUBRICATING.

Lubroleine A cylinder oil 50 in. barrels.
Lubroleine D cylinder oil 40 in. barrels.
Lubroleine A machine oil 45 in. barrels.
Lubroleine B machine oil 35 in. barrels.
Lubroleine A engine oil 50 in. barrels.
Lubroleine B engine oil 40 in. barrels.
In cases 5c gal. extra.
Crescent Axle Grease.—Barrels, 3c per lb; 100-lb. kegs 3½c lb.; 2-lb. decorated tins, $12, gross less 5 per cent.
Texas Star Axle Grease.—Barrels, 2½c per lb.; 100-lb. kegs, 3c per lb.
See Axle Grease, page 2.

Packing.

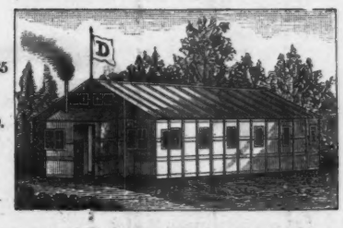
Eureka, 75c. per lb. Dis., 40%.
Soapstone—Standard, 8c. per lb.
XX. 11c. per lb.
Crown—No. 1, 23c. per lb.
No. 2, 26c. per lb.
Climax, 9c. per lb. Net.

SELDEN'S PATENT.

For Steam, Air, Water and Ammonia.
With Rubber Core, 60 cents per lb.
Dis., 25 and 5%.
With canvas core, 50 cents per lb.
Dis., 30 and 5%.
See Rubber Packing, page 7.

Portable Houses.

Weight, 450 lbs.
Price, $150.
Closes securely.
Dis., 10%.



Weight, 85 lbs. per section.
Price, $220.
Dis., 10%.

No. 10.—26 × 33 ft., including veranda and rear extension. Main part, 19 × 26 ft.....$500.00

F. o. b. Cars Chicago or New York

Size.	Doors.	Windows.	No. porch.	End porch	Side porch.
7 × 9	1	2	$64.00	$71.00	$73.00
7 × 12	1	2	75.00	82.00	87.00
7 × 16	1	2	90.00	97.00	106.00
7 × 19	2	4	117 00	124.00	136.00
10 × 9	1	2	70.00	80.00	79.00
10 × 12	1	2	92.00	102.00	104.00
10 × 16	1	4	108.00	118.00	124.00
10 × 19	2	4	134.00	144.00	153.00
10 × 26	2	4	172.00	182.00	198.00
10 × 32	2	6	203.00	213.00	235.00
12 × 12	1	2	102.00	114.00	114.00
12 × 16	2	4	138.00	150.00	154.00
12 × 19	2	4	160.00	172.00	179.00
12 × 26	2	4	193.00	205.00	219.30
12 × 32	2	6	245.00	257.00	277.00

Post Hole Diggers.

Little Giant.....	$36.00 doz 11 cu.ft.
Hercules.....	30.00 " " " "
New Champion....	20.00 " " " "
Scheidler.....	36.00 " " "

Dis. 40% f.o.b. New York or Boston.

Press.

Combined press for cutting, forming, horning and seaming.

Particulars of flat front presses, including beds, slides, bolsters, plates, etc.

Prices are net, delivered on steamers in New York, including insurance, etc.

Nominal size of press	41	42	43	44	450
Price, including et ceteras	$130	$200	$260	$420	$660
Weight, about.....lbs	600	1050	1900	3600	7200
Greatest diameter that can be wired.....ins	5	7	10	14	20
Greatest depth that can be wired.....ins	8	10	13	16½	20
Hole through bed—circle intersecting.....ins	4½	6	8¼	12	17
Hole through back—width.....ins	8	9½	12	15½	20¼
Width between die clamps—clear.....ins	8	11	15	20	27
Distance back from center of slide bar.....ins	4½	5½	7	9	12
Height to slide-bar, when up..ins	5¼	6½	7½	8½	9
Stroke of slide-bar.....ins	1	1¼	1½	1¾	"
Adjustment of slide-bar.....ins	1	1¼	1½	1¾	"
Diameter of fly-wheel.....ins	20	26	32	38	44
Width of fly-wheel.....ins	3	4	5	6	7
Weight of fly-wheel, about....lbs	125	250	420	725	1100
Speed per minute, about.....rev	120	110	100	90	80
Cubic feet boxed, about.....	30	40	50	60	70

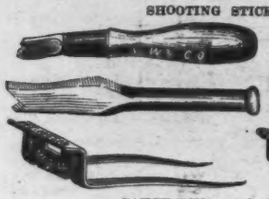
Printers' Sundries.

Wood rules, 12 cents per yard.
Wood rules, on end wood, 15 cents per foot.

EUREKA STAND.
12 full cases.

Price without cases.....$12.00
Boxing and cartage..... 1.25

SHOOTING STICKS.



Each.
No. 1, 75c.
No. 2, $1.
No. 4, 45c., black.
No. 4, 60c., bright.
No. 5, 60c., black.
No. 5, 75c., bright.

GAUGE PINS—ALL SIZES.

Brass, 40c. doz. | Steel, 60c. doz.
Wire, 25c. doz. | Golden, 40c. doz.

MITRE BOXES.

Regular size, 2 in., 50c. each.
Extra size, 3½ in., 75c. each.

LEAD CUTTER.

Curtis' Lead Cutter $2.00

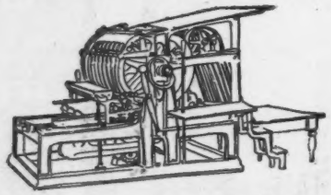
PROOF PRESS, "OUR OWN."

9 × 32, complete, with Brayer $28.00

THE GLOBE PRESS.

8 x 12 in. inside clear, with throw-off	$150.00
9 x 13 in. inside clear, with throw-off	175.00
10 x 15 in. inside clear, with throw-off	200.00
11 x 17 in. inside clear, with throw-off	250.00
Steam fixtures	15.00
Fountain	12.50

Dis. 20%.



THE "LIBERTY" CYLINDER PRESS.

For Newspaper and Job Printing.

No.	Bed.	Form.	
5	29 × 42	24 × 40	$1,200
6	33 × 47	28½ × 45	1,300
7	37 × 51	33 × 49	1,600

Dis., 20 and 5%.

THE "LIBERTY" JOB PRINTING PRESS.

No.	Size of chase.		
2 — 7	× 11		$200
2a— 9	× 13		250
3 —10	× 15		300
3a—11	× 17		350
4 —13	× 19		400
5 —14½	× 22		500

Dis., 12½ and 5%.

Two sizes built extra strong for boxmakers, embossing, etc.

No. 3a—11 × 17 ..... $375
4 —13 × 19 425

Dis., 12 and 5%.

Fountains, either size, $25 extra, if ordered with press. Steam fixtures, either size, $15 extra.

THE AMERICAN CARD AND BILL HEAD PRESS.

No. 5—4 × 6		$10
7—6 × 9		30
8—8 × 12		60

Dis., 20% and 5%.

THE "LIBERTY" PAPER CUTTER.

Cuts 30 inches $140.00
Extra knife 18.80

Dis., 12½ and 5%.

THE "LIBERTY" IMPOSING TABLES

Marble top.

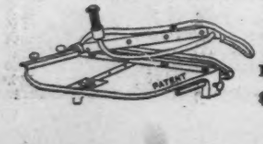
No. 1—24 × 36		$24
2—32 × 48		36
3—26 × 74		44
4—36 × 48		48

Dis., 12½ and 5%.

Slate Top.

No. 1—24 x 36	$18
2—32 x 48	25
3—26 x 74	32

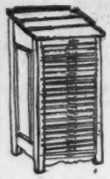
Dis., 12½ and 5%.



Kelsey & Co.,

The Eagle card and Paper Cutter, 24¼ inch, $12 each, $100 per doz.

THE "LIBERTY" TYPE CABINETS.



Number of cases.	Stained. Flat. $	Stained. Galley.* $	Grained. Flat. $	Grained. Galley.* $
12⅞	12.00	14.50	14.00	17.00
16⅞	15.00	17.50	17.00	20.00
18⅞	16.50	19.00	18.50	21.50
20⅞	18.00	20.50	20.00	23.00
12¾	15.00	17.50	17.00	20.00
16¾	18.00	20.50	20.00	23.00
18¾	19.50	22.00	21.50	24.50
20¾	22.00	24.50	23.00	26.00
12 full	18.00	20.50	20.00	23.00
16 "	22.00	24.50	24.00	27.00
18 "	24.00	26.50	26.00	29.00
20 "	26.00	28.50	28.00	31.00

Number of cases.	Pine. Flat. $	Pine. Galley.* $	Cherry. Flat. $	Cherry. Galley.* $	Napanoch. Flat. $	Napanoch. Galley.* $	Walnut. Flat. $	Walnut. Galley.* $
12⅞	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16⅞	22.00	25.00	24.00	27.00	26.00	29.00	27.00	30.00
18⅞	24.00	27.00	.....	.....	.....	.....	.....	.....
20⅞	26.00	29.00	28.00	31.00	30.00	33.00	31.00	34.00
12¾	21.00	24.00	23.00	26.00	25.00	28.00	26.00	29.00
16¾	25.00	28.00	27.00	30.00	29.00	32.00	30.00	33.00
18¾	27.00	30.00	.....	.....	.....	.....	.....	.....
20¾	29.00	32.00	31.00	34.00	33.00	36.00	34.00	37.00
12 full	24.00	27.00	26.00	29.00	28.00	31.00	29.00	32.00
16 "	28.00	31.00	30.00	33.00	32.00	35.00	33.00	36.00
18 "	30.00	33.00	.....	.....	.....	.....	.....	.....
20 "	32.00	35.00	34.00	37.00	36.00	39.00	37.00	40.00

—*Furnished with galley top and extra drawer for copy.

Dis., 20 and 5%.

THE "LIBERTY" CASE STANDS AND RACKS.

Stands.	
Single, without racks	$3.75
" with racks for 8 full cases	4.00
Single, with racks for 10 full cases	4.25
Single, with racks for 12 full cases	4.50
Single, with racks for 14 full cases	4.75
Double, without racks	4.25
" with racks for 8 full cases	4.50
Double, with racks for 16 full cases, and gal. rest	6.25
Double, with racks for 20 full cases and gal. rest	6.50
" " " " 24 " " " " "	6.75
" " " " 24 ⅔ cases	5.25
" " " " 8 full and 8 ⅔ cases	5.00
" " " " 8 " " 8 ⅔ "	5.25
" " " " 10 " " 12 ⅔ "	5.55
" " " " 12 " " 16 ⅔ "	5.70
" " " " 12 " " 16 ¾ "	6.05
Stands with closed ends, extra	2.00
Extra slides for stands, each	.00

GALLEY RACKS.

From $3 up.

LEAD CUTTERS,

From $2 up.

[illegible] and 5%.

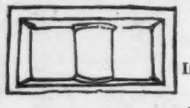
THE "LIBERTY" TYPE CASES.

Name.	Outside Measurements.
Full size	32¼x16⅛x1 9-16
Rooker size	28½x14¼x1 9-16
¾ size	26x16⅛x1¾
⅔ size	22⅞x16⅛x1⅝
Enlarged size	32¼x23x2 3-16
Wood type "	32¼x23x1 9-16
Mammoth "	44x23x1 9-16

Cabinet case sides extend 1½ to 3 inches. In ordering cabinet cases, state whether high or low fonts are wanted.

THE "LIBERTY" STEEL SHOOTING STICKS.

Bright, $1 each.
Nickelplated, $1.25 each.
Dis., 40%.



STANDARD METAL FURNITURE

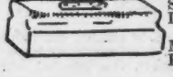
25c. a pound.
In fonts of 25, 50, 75 and 100 lbs.
Dis., 15%.

THE "LIBERTY" MALLETS.

Hickory, small	$ .20
" medium	.25
" large	.30
" iron bound	1.00
Lignum Vitæ, No. 4	.30
" " No. 3	.40
" " No. 2	.50
" " No. 1	.70

Dis. 20 and 5%.

THE "LIBERTY" PLANERS AND PROOF PLANERS.



Midget planer	10c.
Small Maple	20c.
Large "	25c.
" b'ked with leather	30c.
Midget " " "	12c.
Proof planer, faced with cloth	50c.

Dis., 40%.

COMPOSING STICKS.

GROVER'S PATENT AND UNION.

Screw or News.

6 in. 1.10	$ .90
8 " 1.20	1.10
10 " 1.40	1.20
12 " 1.60	1.40
14 " 1.80	1.60
16 " 2.00	1.80
18 " 2.20	2.00
20 " 2.40	2.20

Composing rules, 14 ems pica and under, 25 cents.

THE "LIBERTY" COMPOSING STICKS.

Grover.

6 in., Steel	$ .90	16 in., Steel	$1.80
8 "	1.00	18 "	2.00
10 "	1.20	20 "	2.20
12 "	1.40	Extra Clasp	.10
14 "	1.60	Extra Knee	.40

Screw.

6 in., Steel	$ .75	16 in., Steel	$1.45
8 "	.80	18 "	1.60
10 "	1.00	20 "	1.75
12 "	1.15	Extra Knee	.30
14 "	1.30	" Screw and Nut	.10

Dis., 40%.

Yankee.

6-in., Steel	$ .75	12 in., Steel	$1.15
8 "	.80	Extra Knee	.30
10 "	1.00	" Clamp and Screw	.15

Other Sizes to Order.
Dis., 40%.

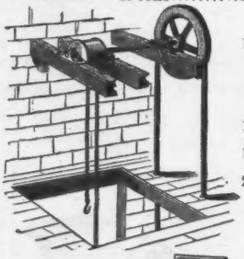
Albion.

6-in., Steel	$1.00	6-in, German Silver	$1.50
8 "	1.10	8 " " "	1.75
Extra Knee	.40	Extra Screw and Nut	.10

Pulley Blocks.

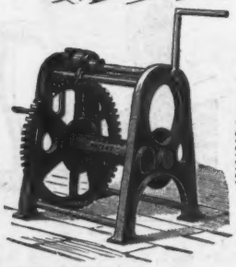
WESTON DIRECT.

	Each.
⅛ ton	$10
¼ ton	13
½ ton	15
1 ton	20
1½ tons	25
2 tons	30
3 tons	40
Geared.	
1 ton	45
2 tons	35
3 tons	60
4 tons	80
5 tons	110
6 tons	150
8 tons	210
10 tons	250



DOUBLE LIFT HOISTS FOR HATCHWAYS, ETC.

500 lbs	$25.00
1000 "	50.00
1500 "	65.00
2000 "	80.00
500 "	30.00



WESTON CRAB SAFETY BRAKE, HANDLES CANNOT FLY BACK.

	Each.
21	$35.00
22	45.00
23	65.00
25	100.00

Pumps.

Prices on all pumps include cylinders.

No.	Dia. Cyl.	Suction.	Cap. stroke.	Price Iron.	Price Brass cyl.
0	2 in.	1 in.	1-15 gal.	$3.50	.....
1	2¼ "	1 "	1-12 "	4.00	$6.00
2	2⅝ "	1¼ "	1-11 "	4.50	7.00
3	2⅞ "	1¼ "	1-10 "	5.00	8.00
4	3 "	1¼ "	1-6 "	5.50	10.00
5	3¼ "	2 "	1-5 "	6.50	14.00
6	3½ "	2 "	1-4 "	8.00	18.00
7	4 "	2½ "	1-3 "	12.00	20.00

Dis., 65%.

1	2½ in.	1¼ in.	1-10 gal.	4.25	.....
2	3 "	1¼ "	1-7 "	4.75	.....
3	3½ "	1¼ "	1-5 "	5.25	.....
4	4 "	1½ "	1-4 "	5.75	.....
5	4½ "	1½ "	1-3 "	6.25	.....

Dis., 70%.

Standard and Cylinder for 1½ in. Iron Pipe, $16.00. Dis., 55%

No. 6½, standard and cylinder, 1¼ in pipe, $13.00.
No. 7½, standard and cylinder, 1¼ in. pipe, $15.00.
No. 8½, standard and cylinder, 1½ in. pipe, $18.00.
With hose and discharge pipe, add $3.00 to list price.
Dis., 55%.

No. 1, diam. cyl., 2½ in.; cap. stroke 1-8 gal.; size pipe, 1¼ in. Price, iron, $12.50; brass cyl., $17.50.
No. 2, diam. cyl., 3 in.; cap. stroke, 1-6 gal.; size pipe, 1¼ or 1½ in. Price, iron, $14.50; brass cyl., $18.50.
No. 3, diam. cyl., 4 in.; cap. stroke, 2-5, gal.; size pipe, 1½ or 2 in. Price, iron, $23.50; brass cyl., $34.50. Dis., 55%.

No. 1, diam. cyl., 3 in.; suction, 1¼ in. cap. stroke, 3-10 gal. Price, iron, $28.00; brass cyl., $38.00.
No. 2, diam. cyl., 4 in.; suction, 1½ in.; cap. stroke, 1-2, gal. Price, iron, $32.00; brass cyl., $60.00.
No. 3, diam. cyl., 5 in.; suction, 2 in.; cap stroke, 6-7 gal. Price, iron, $35.00: brass, cyl., $60.00.
No. 4, diam. cyl., 6 in.; suction, 2½ in.;

cap. stroke, 1 1-5 gal. Price, iron, $45.00; brass cyl. $120.00. Dis., 45%.

No.	Diam. cyl.	Cap. stroke.	Stroke.	Pipe.	Price.
0	2 in.	1-11 gal.	7 in.	1 in.	$21.50
00	2¼ "	1-7 "	7 "	1 "	23.00
1	3 "	1-5 "	7 "	1¼ "	25.25
2	3½ "	1-3 "	7 "	1½ "	27.25
3	4 "	4-10 "	7 "	2 "	30.50
3½	4½ "	1-2 "	7 "	2 "	37.50
4	5 "	8-10 "	10 "	2½ "	44.00
4½	5½ "	1 "	10 "	2½ "	47.00
5	6 "	1 1-5 "	10 "	3 "	50.00

Dis., 40%.

No.	Diam. cyl.	Cap. stroke.	Diam. pipe.	Price. Iron.	Price. Br's cyl.
1	2 in	1-5 gal.	1 in.	$39	$51
2	2½ "	1-3 "	1¼ "	41	56
3	3 "	1-2 "	1½ "	45	62
4	3½ "	6-7 "	2 "	51	81
5	4 "	7-8 "	2 "	63	114
6	4½ "	1 "	2 "	80	155

Dis., 40%.

With Tight and Loose Pulleys.

No. 1, cap. per rev., 1-6 gal.; size of pipe, 1¼ in.; price, iron, $26; bronze, $45.

No. 2, cap. per rev., 1-5 gal.; size of pipe, 1½ in.; price, iron, $31; bronze, $55.

No. 4, cap. per rev., 1-3 gal.; size of pipe, 2 in.; price, iron, $48; bronze, $75.

Pulleys on Nos. 1 and 2 are 8 in. diam., 2½ in. face; on No. 4, 12 in. diam., 3½ in face.

Balance wheels for above pumps. $1, $2, and $3, according to size. Dis., 45%.

No. 2, ½ to 2 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, ¾ in.; discharge, ⅜ in.; price, $9.

No. 3, 1 to 4 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 1 in.; discharge, ⅝ in.; price, $11.

No. 4, 2 to 8 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 1¼ in; discharge ½ in; price $14

No. 5, 3 to 14 gal, per min.; length of drive pipe, 25 to 40 ft.; calabre of pipes, drive 2 in; discharge 1 in; price $22.

No. 6, 4 to 25 gal. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 2½ in.; discharge, 1¼ in.; price, $40.

No. 7, 8 to 60 gals. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 4 in.; discharge, 2 in.; price, $75.

No. 8, 12 to 120 gal. per min.; length of drive pipe, 30 to 50 ft.; calibre of pipes, drive, 6 in.; discoarge, 2½ in.; price, $125. Dis., 45%.

Railroad Dumping Cars and Carts.

Cars.	Gauge.	Cap.	Net	Cap.	Net	Cap.	Net
Side Dumping	24"	1 c. y.	$55	2 c. y.	$65	3 c. y.	$75*
End "	"	"	55	"	65	"	75*
Revolving "	"	"	70	"	80	"	90*
Bottom "	"	"	80	"	90	"	100*
Tunnel	"	"	55	"	65	"	75*
Mine	"	"	50	"	60	"	70*
Plantation	30"		43				
Logging	36"		170				
"	4' 8½"		185				
Hand	36"		45				
"	4' 8½"		50				
Push	36"		40				
"	4' 8½"		45				
R.R. Construction	36"		60				
"	4' 8½"		65				
Carts.							
Plantation and Railroad Wagons.			45 to 75				
McEwen Patent Dumping		1 "	175	1½ "	200		

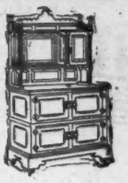
*These cars built of any gauge from 18" to 56½" and of any capacity from ½ to 6 cu. yd.

Refrigerators.

Indurated Fibre and Stoneware-Lined.

Nos. 75, 85.

No.	High.	Wide.	Deep.	Price.
35	46¾	28¾	20½	$20.00
75	44¼	33¾	23½	28.00
85	47¾	38	23½	34.00



No. 2. No. 6.

No.	High	Wide.	Deep.	Price.
2	41	46	26	$36.00
6	84	46	26	60.00

Mirror 16 by 18 in. Dis., 30 and 5%.

Rat Traps.

1 doz. in box.

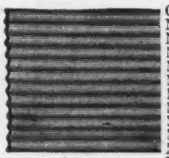
1 gross in case.

$30 per gross.

Dis. 50 and—0%.

Roofing.

CORRUGATED IRON.
2½ inch corrugations.



Gauge.	Per square
No. 18, painted red	$9.10
No. 20, " "	7.60
No. 22, " "	6.50
No. 24, " "	5.35
No. 26, " "	4.65
No. 27, " "	4.35
No. 28, " "	4.00
No. 18, galvanized	13.30
No. 20, "	10.60
No. 22, "	9.10
No. 24, "	7.45
No. 26, galvanized	7.05
No. 27, "	6.95
No. 28, "	6.75

Dis., 10%. F. o. b. N. Y.

Sash Chains.

No. A. "Giant" metal, 15c. pr. ft., wts. not over 125 lbs.

No. 1. "Giant" metal, 12c. pr. ft., wts. not over 75 lbs.

No. 2. "Giant" metal, 10c. pr. ft., wts. not over 40 lbs.

No. 0. "Giant" metal, 8c. pr. ft., wts. not over 25 lbs.

No. 1. Red metal, 10c. pr. ft., wts. not over 40 lbs.

No. 2. Red metal, 8c. pr. ft., wts. not over 30 lbs.

No. 0. Red metal, 6c. pr. ft. wts. not over 15 lbs.

No. 1. Steel, 8c. pr. ft., wts. not 75 lbs.

No. 2. Steel, 6c. pr. ft., wts. not over 30 lbs.

No. 0. Steel, 4c. pr. ft., wts. not over 15 lbs.

No. 1. Steel, black enameled, 9c. pr. ft., wts. not over 75 lbs.

No. 2. Steel, black enameled, 7c. pr. ft., wts. not over 30 lbs.

No. 0. Steel, black enameled, 5c. pr. ft., wts. not over 15 lbs.

Fastenings for hanging a window of 2 sashes for Nos. 1 and 2 chains, consisting of 4 hooks, 4 rings, 4 sash irons, a set, 18c. per set.

Fastenings for hanging a window of 2 sashes for No. 0 chains, 14c. per set.

Dis. on				
"Giant" metal chain	40	10	10%	
" " Red metal chain	40	10	10	10%
" " Steel " "	40	10	10	10%
" " Fastenings	40	10	10%	

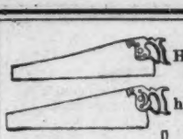
Saws.

PATENT GROUND AND TEMPERED SOLID TOOTH CIRCULAR SAWS.

Diameter. Inch.	Thickness. Gauge.	Size of hole—Inch.	Price each.	Extra for each additional gauge, heavier.	Prices for beveling new saws (grinding or beveling old saws, extra). Per gauge.
1	24	⅛	$0.50	$0.01	$0.06
2	23	⅛	.60	.01½	.08
3	21	⅛	.70	.02½	.10
4	19	¾	.90	.03	.14
6	18	¾	1.30	.05	.18
8	18	⅞	1.75	.08	.22
10	16	1	2.30	.12	.28
12	15	1	3.00	.17	.35
16	14	1¼	5.50	.25	.50
20	13	1 5-16	8.50	.35	.70
24	11	1⅜	12.00	.55	.90
28	10	1½	16.00	.80	1.20
32	10	1⅝	20.00	1.00	1.40
36	9	1⅝	25.50	1.40	1.70
40	9	2	35.00	2.00	2.00
44	8	2	52.50	3.00	2.40
48	8	2	70.00	4.00	2.80
52	7	2	90.00	5.00	3.25
56	7	2	115.00	7.00	3.75
60	6	2	145.00	9.00	4.25
64	6	2	180.00	12.00	5.00
68	5	2	225.00	18.00	5.75
72	5	2	290.00	24.00	6.55
76	5	2	373.00	30.00	7.50

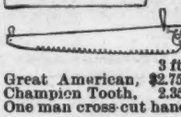
Circular saws to cut metal or ivory, 50% advance. No extra charge for saws one gauge thicker than list. Circular saws beveled one gauge without extra charge up to 44 inches; 44 inches and larger, beveled two gauges without extra charge.

Hand—London Spring Steel; four brass screws.
26 in. $30.00 per doz.



Hand—Skew Back Saw, Apple Handle; 5 screw.
26 in. $22.00 per doz.

Hand—Grained Blade, Beech handle, polished edge; 4 screws.
26 in. $20.00 per doz.



One man Cross-Cut—Supplementary Handle.

	3 ft.	3½ ft.	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
Great American,	$2.75	$3.00	$3.50	$4.00	$4.50	$5.00	$5.50
Champion Tooth,	2.35	2.60	3.15	3.50	3.85	4.25	4.65

One man cross-cut handles, $4.50 per doz.

Saw Set.

Adjustable ball and socket saw clamp,

Japanned, $14 per doz.

Scales.—Discount on all scales 50 and 10 per cent.

Postal scales.

No. 1, capacity ⅛ to 9 oz. $3.00.
No. 2, capacity ⅛ to 12 oz. $4.00.
No. 3, capacity ⅛ to 34 oz. $6.00
No. 4, capacity ⅛ oz. to 4 lbs., $8.00

Butter Trip Scales, slab, weights and scoop.

No. 7, ½ oz. to 10 lbs., 10 in. slab,	without side beam		$10.50
" " " " " "	with	"	11.50
" 8 " " 20 lbs., 12 in. "	without	"	12.50
" " " " " "	with	"	13.50

Tea Scales—All Seamless Scoops.

Capacity.	Scoop.	Capacity.	Scoop.
¼ oz. to 10 lbs.	Tin ..$8.00	¼ oz. to 10 lbs.	Brass .. 9.00

Druggists.

Capacity.	Scoop.	Capacity.	Scoop.
1-16 oz. to 8 lbs.	Tin ..$10.00	1-16 oz. to 8 lbs.	Brass..$11.00

Even balance trip scales, seamless scoop, with weights.

No. 1, capacity ½ oz. to 2 lbs., tin scoop, $5.50 brass scoop, $6.50.
No. 2, capacity ½ oz. to 4 lbs., tin scoop, $6.50; brass scoop, $7.50.
No. 2½, capacity ½ oz. to 18 lbs, tin scoop, $11; brass scoop, $12.50.

Counter.

Capacity.	Scoop.	Capacity.	Scoop.
½ oz. to 36 lbs.	Tin ..$10.00	½ oz. to 36 lbs.	Brass..$12.00

Grocer.

Capacity.	Scoop.	Capacity.	Scoop.
½ oz. to 62 lbs.	Tin...$12.00	½ oz. to 62 lbs.	Brass..$14.00

Meat or Butter Scales, with Slab.

½ oz. to 62 lbs.,	with Single Beam	$14.00
" " " "	Double "	15.00

Patent Boston platform, 13½ in. long by 10 in. wide.

Pillar, 18 in. high, double beam, marked both sides.

With large seamless tin scoop, $25.00
" " " brass " 27.00

Platform scales. Without Wheels.

No.	Capacity.	Platform.	Price.
	400 lbs.	21½ by 15 inches.	$23.00
	600 lbs.	25 by 16 "	30.00
	800 lbs.	25 by 17 "	34.00
	1,000 lbs.	26 by 17 "	39.00
	1,200 lbs.	28 by 20 "	45.00
	1,600 lbs.	29 by 21 "	55.00
	2,000 lbs.	32 by 23 "	70.00

With Wheels.

No.	Capacity.	Platform.	Price.
1	400 lbs.	21½ by 15 inches.	$26.00
2	600 lbs.	25 by 16 "	33.00
3	800 lbs.	25 by 17 "	38.00
4	1,000 lbs.	26 by 17 "	43.00
5	1,200 lbs.	28 by 20 "	49.00
6	1,600 lbs.	29 by 21 "	60.00
7	2,000 lbs.	32 by 23 "	75.00

Brass sliding poise at same price if so specified in order

With Wheels and Drop Lever.

No.	Capacity.	Platform.	Price.
4	1,000 lbs.	26 by 17 inches.	$51.00
5	1,200 lbs.	28 by 20 "	59.00
6	1,600 lbs.	29 by 21 "	70.00
7	2,000 lbs.	32 by 23 "	82.00
8	2,500 lbs.	33¼ by 24½ "	94.00
9	3 000 lbs.	38 by 30 "	125.00

Shears. The Paten' "Eureka

No. 1 cuts round metal up to ¼ in. steel to ⅛, $12.

No. 2 cuts round metal up to ⅛ in., steel to 3-16, $20.

Discount, 25%.

Steel Wire Mats.

Galvanized Steel Wire.		(Style A) "Hartman Flexible."
No. 2.	Size 16x24.	Each . $1.50
No. 3.	" 18x30.	" 2.00
No. 4.	" 22x36.	" 3.00
No. 5.	" 26x48.	" 4.50
No. 6.	" 30x48.	" 5.25
No. 7.	" 36x48.	" 6.50
No. 8.	" 36x60.	" 8.00
No. 9.	" 36x72.	" 10.00

Brass mats "inst' double the price of galvanized Style A) for similar sizes.
3 doz. lots, dis. 33 1-3%.
6 doz. lots, dis. 40%.
12 doz. lots, dis. 40 and 5%.

Screws.

STEEL SCREWS ADD 50% TO LIST.
Prices are per 100.
Hexagon Cap Screws.
Heads on Steam-tight Screws not polished, unless so ordered. Can make these 12 inches long.

Diam. head.	7-16	½	9-16	⅝	¾	13-16	⅞	1	1⅛	1¼	1⅜
Length head.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
Diam. screw.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞		1⅛
¾	3.00	3.25	3.75	4.40	5.50	7.00					
1	3.25	3.50	4.00	4.70	5.70	7.00	9.50				
1¼	3.50	3.75	4.25	5.00	6.00	7.50	9.50	12.20			
1½	3.75	4.00	4.50	5.30	6.30	8.00	10.00	12.20	16.00		
1¾	4.00	4.25	4.75	5.60	6.60	8.50	10.60	12.80	16.60	21.20	
2	4.25	4.60	5.05	5.95	7.00	9.10	11.20	13.40	17.20	22.30	29.00
2¼		5.00	5.40	6.35	7.50	9.70	11.90	14.10	17.90	23.60	30.50
2½			5.80	6.80	8.00	10.40	12.70	14.90	18.80	25.10	32.30
2¾				7.30	8.60	11.20	13.60	15.90	23.00	26.90	34.40
3					9.30	12.10	14.70	17.00	21.80	29.00	37.00
Thread to in.	20	18	16	14	12	12	11	10	9	8	7
Add for each ¼ in.	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40	3.00

Dis., heads ground, 60%; dis., heads black, 60 and 5%; dis., heads extra finish, 50%; dis., heads case-hardened, 5%; dis., heads polished after hardening, 45%.

SQUARE CAP SCREWS.

Diam. head.	⅝	7-16	½	9-16	⅝	11/16	¾	⅞	1⅛	1¼	1⅜
Length head.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
Diam screw.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
¾	2.40	2.75	3.20	3.80	4.40	5.75					
1	2.60	2.95	3.40	4.00	4.70	5.75	7.70				
1¼	2.75	3.10	3.65	4.20	4.95	6.05	7.70	10.50			
1½	2.90	3.30	3.85	4.45	5.25	6.35	8.25	10.50	14.00		
1¾	3.05	3.50	4.10	4.70	5.55	6.65	8.80	11.10	14.80	18.00	
2	3.25	3.70	4.35	4.95	5.90	7.05	9.40	11.80	15.70	19.00	22.50
2¼		4.00	4.65	5.25	6.30	7.55	10.10	12.60	16.70	20.20	24.00
2½			5.00	5.60	6.75	8.15	10.90	13.50	17.80	21.50	25.80
2¾				6.00	7.25	8.85	11.80	14.60	19.10	23.10	27.90
3					7.80	9.65	12.80	15.90	20.60	25.00	30.50
Thread to in.	20	18	16	14	12	12	11	10	9	8	7
Add for each ¼ in.	25	35	45	55	65	90	1.20	1.50	1.80	2.30	3.00

Dis., heads ground, 65%; dis., heads black, 65 and 5%; dis., heads extra finish, 55%; dis., heads case hardened, 60%; dis., heads polished-hardened, 50%.

MILLED HEADS, COLLAR SCREWS

Diameter of Collar.	¼	11/32	7/16	½	⅝	11/16	13/16	15/16	1	1¼
Diameter of Screw.	⅛	3/16	¼	5/16	⅜	7/16	½	9/16	⅝	¾
¾	2.50	2.80	3.10	3.75	4.40	5.00	6.25			
1	2.80	3.10	3.40	4.05	4.70	5.30	6.60	8.25		
1¼	3.10	3.40	3.70	4.35	5.00	5.60	7.00	8.60	11.25	
1½	3.45	3.70	4 00	4.70	5.30	5.95	7.40	9.00	11.90	15.00
1¾			4.05	4.25	5.05	5.65	6.35	7.80	9.45	12.60	15.60
2				4.70	5.45	6.25	6.85	8.40	10.00	13.35	16.25
2¼					5.95	6.85	7.40	9.00	10.60	14.15	17.10
2½						7.50	8.10	9.60	11.25	15.00	18.00
2¾							8.75	10.30	11.90	15.90	19.00
3								11.00	12.60	16.85	20.00
Threads to inch	40	30	20	18	16	14	12 or 13	12	11	10	
Add for each ¼ inch	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40	

MILLED FROM SOLID BAR.

Fillister.	Bevel Head.							Button Head		
Diam. Head	3-16	¼	⅜	7-16	9-16	⅝	¾	13-16	⅞	1
Length Head	⅛	3-16	¼	5-16	⅜	7-16	½	9-16	⅝	¾
Diam. Screw	⅛	3-16	¼	5-16	⅜	7-16	½	9-16	⅝	¾
¾	2.00	2.25	2.50	3.00	3.50	4.00	5.00			
1	2.25	2.50	2.75	3.25	3.75	4.25	5.30	6.50		
1¼	2.50	2.75	3.00	3.50	4.00	4.50	5.60	6.90	9.00	
1½	2.75	3.00	3.25	3.75	4.25	4.75	5.90	7.20	9.50	12.00
1¾		3.25	3.50	4.00	4.50	5.00	6.20	7.50	10.00	12.50
2			3.75	4.35	5.00	5.50	6.75	8.00	10.75	13.00
2¼				4.75	5.50	6.00	7.25	8.50	11.50	13.75
2½					6.00	6.50	7.75	9.00	12.00	14.50
2¾						7.00	8.25	9.50	12.75	15 25
3							8.75	10.00	13.50	16.00
Threads to inch.	40	30	20	18	16	14	12	12	11	10

Length under Head.

Head on Bevel and Button Head Screws, 1-16 larger in diameter than above specifications.
Price, according to size of head.
Discount, 50%; case hardened, 45%; case hardened and polished, 35%.

Soups (French).

	Per dozen. In Cans— Quarts.	Pints.	In Glass. 1¼ pt.
Green turtle	$8.00	$4.32	$9.00
Terrapin			
Chicken	3.75	2.25	
Mulligatawny			
Mock turtle			
Ox tail			4.50
Consommé			
Tomato			
Julienne			
Printanier	3.50	2.10	
French bouillon			
Mutton broth			None in glass.
Vegetable			
Beef			
Pea			

Packed in cases of..... 2 doz. 4 doz. 1 doz.
Regular Assorted Cases. In Cans—Quarts.
2 Chicken, 1 Mulligatawny, 3 Mock Turtle, 3 Ox Tail, 2 Consommé, 2 Tomato, 3 Julienne, 1 Printanier, 1 Mutton Broth, 1 Vegetable, 1 Beef, 2 French Bouillon, 2 Pea. Per doz., $3.55.
In Glass.
11 Chicken, 1 Mulligatawny, 2 Mock Turtle, 1 Ox Tail, 2 Consommé, 2 Tomato, 1 Julienne, Printanier, 1 Mutton Broth.
Terms cash Discounts: 5% for lots of 10 cases, 10% for lots of 25 cases. 15% for lots of 50 cases.

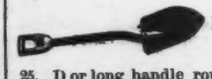
Spades and Shovels.

JONES

Patent plain black solid cast-steel shovels and spades.

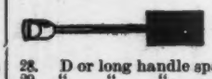
Patent solid steel shovel.

No.		No.	Per Doz. Black.	Per Doz. Pol's'd
20.	D. or long handle sq.-point shovels.	2	$15.50	$16.50
21.	" " " " "	3	16.25	17.25
22.	" " " " "	4	17.00	18.50
23.	" " " " "	6	17.50	19.00
24.	" " " " charcoal.	8	20.50	22.00



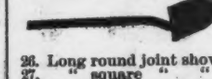
Pt. plain back solid cast steel shovel.

25.	D or long handle round-point shovels.	3	16.25	17.25



Patent solid cast steel spade.

28.	D or long handle spades	2	16.00	17.00
29.	" " " "	3	16.50	18.00



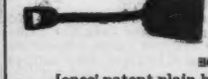
Patent plain back solid cast steel.

26.	Long round joint shovel	No. 2	15.50	16.50
27.	" square "	No. 2	15.50	16.50
32.	D. handle square-point molders' shovels	2	.....	17.00
33.	D. handle square point railroad, extra heavy	2	15.75	
34.	D. handle round point railroad, extra heavy	3	16.50	
35.	L. handle round point shovel, with foot cap	2	16.00	17.00

GRAY'S CAST.

Patent plain back solid-steel shovels and spades.

50.	D. or long handle sq.-point shovels.	2	$12.00	$13.00
51.	" " " " "	3	12.75	14.00
52.	" " " round point "	3	12.75	14.00
55.	D. handle spades	2	12.25	13.25
56.	" " "	3	13.00	14.25



Patent plain corrugated cast steel scoop.

SCOOPS.

Jones' patent plain back solid corrugated cast steel scoops.

90.	D. or long handle solid cast steel	2	$13.50	$14.50
91.	" " " " "	4	14.50	15.50
91½.	" " " " "	6	16.50	17.50

Jones' riveted scoops.

92.	Cast steel D. or long handle	2	13.50	14.50
93.	" " " " "	4	14.50	15.50
94.	" " " " "	6	16.50	17.50
			Half polished.	
95.	" " "	8		$20.00
96.	" " "	10		22.50
97.	" " Locomotive or coal (heavy)	6	17.50	
98.	" Long or D. handle for salt heavy)		17.50	
99.	" D. handle flour and house furnace		10.50	
100.	" D. handle r'd-pt. for coal (extra heavy)	6	20.00	
101.	" ash pit, furnace L. handle	2		Polished. 13.00
102.	" " 32 in. D.	2		13.50
103.	" " " 42 " iron D. handle	2		14.00

Ditching spade.

124.	D handle ditching (flat)	18.00	19.50
125.	D handle post hole (concave)	18.00	19.50
126.	D handle Alcock (for clay and brick)	16.00	17.00

Discount on shovels and spades, 50 and 10.
" " scoops, 50.
Boxed f.o.b. New York, Boston or Montreal.
The solid shovels, spades and scoops are made from cast steel bars by a recently patented process, the blade and strap being in one piece, not welded. All goods are American patterns

Stencil Inks.

Black.

No.	Per can.	Per cake.	No.	Per can.	Per cake.
1	7 cents	3 cents	3	20 cents.	12 cents
2	10 "	5 "	4	30 "	20 "

Blue.

1	10 cents.	6 cents	3	30 cents.	22 cent
2	15 "	9 "	4	50 "	40 "

Red and Green.

1	12 cents	8 cents	3	50 cents.	42 cents
2	20 "	15 "	4	90 "	80 "

Per doz. cans or cakes, net, per gross, 10% less.

Indelible Ink.

Small bottles per	100	$2.75
" "	500	12.00
" "	1,000	20.00

STENCIL COMBINATIONS.
Contains Alphabet, Figures, Brush, and Ink.

½ inch, per doz	$5.00
¾ " "	5.40
1 " "	5.75
1¼ " "	7 50
1½ " "	8.40
" "	10.00
2½ " "	15.00

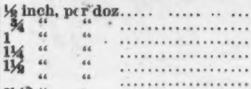
Dis., 10%.

Tools. ARTISANS.

Chisel (Mason).

Stone, 5 and 8c. lb., net.

Mill Picks.

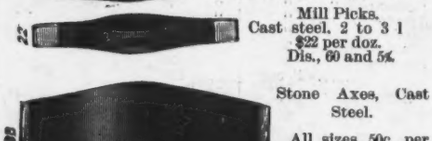


Cast steel, 2 to 3 l $22 per doz.
Dis., 60 and 5%.

Stone Axes, Cast Steel.

All sizes, 50c. per lb.

Dis., 70 and 10%.



Five lbs. and over, 40c.; with teeth, 45c.; 3 to 5 lbs., 45c.; with teeth, 50c.; under 3 lbs., 50c.; with teeth, 55c.
Nos. 40 and 41, spalling or stone hammer, 5 lbs. and ver, 36c.; 3 to 5 lbs., 40c.; under 3 lbs., 45c. per lb.
Nos. 40 and 41, spalling hammers, 9 to 20 lbs., steel face per lb., 17c. Dis., 70 and 10%

Ship or Top Mauls, Steel Face, 4 to 8 lbs., 28c. per lb.

Dis., 50, 10 and 5%..

Steel Wedges, wood, 1st qual., 5c. lb.

Cooper Frocs.

8 in.	⅋ doz.	$13.00
10 in.	⅋ doz.	13.50
12 in.	⅋ doz.	14.00
14 in.	⅋ doz.	14.50
16 in.	⅋ doz.	15.00

Discount, 60%.

60 days, 2% 10 days.

Vise.

No 1. Solid Box Vises.

		Each.
No. 25, 3½ in.	Jaw	$12.00
" 30, 3½	"	11.00
" 55, 3⅝	"	10.00
" 40, 4	"	10.50
" 45, 4¼	"	11.00
" 50, 4½	"	11.50
" 55, 4⅝	"	12.00
" 60, 4¾	"	13.00
" 65, 4¾	"	14.00
" 70, 5	"	15.00
" 75, 5	"	16.00
" 80, 5¼	"	17.50
" 85, 5¼	"	18.50
" 90, 5½	"	20.00
" 95, 5¾	"	21.00
" 100, 6	"	22.00
" 105, 6	"	23.00
" 110, 6¼	"	24.00
" 115, 6¼	"	25.00
" 120, 6½	"	26.00
" 125, 6½	"	27.50
" 130, 6¾	"	29.00

	Each.		Each.
No. 135, 6¾ in.	Jaw $31.50	No. 170, 7¼ in.	Jaw $44.50
" 140, 7 "	33.00	" 180, 8 "	47.00
" 145, 7 "	35.00	" 190, 8 "	53.00
" 150, 7 "	36.00	" 200, 8 "	56.00
160, 7¼ "	41.50		

Dis., 60 and 10%.

MINERS.

Adze Eye Coal Picks.
Same list and dis. as No. 16.

Anthracite Coal Picks.
Same list and dis. as No. 16.

Stone Picks, per doz.
No. 18, 6 to 7 lbs...$16.50.
No. 18, 7 to 8 lbs... 17.50.
No. 18, 8 to 9 lbs... 18.50.
Dis., 60 and 5%.

No.	Coal Picks.	Per doz.
16, Weight, 2	lbs.	$8.50
16, "	2¾ "	9.00
16, "	3 "	9.50
16, "	3¼ "	10.00
16, "	4 "	10.50
16, "	4½ "	11.00
16, "	5 "	11.50
16, "	5½ "	12.00
16, "	6 "	12.50
16, "	6½ "	13.00
16, "	7 "	14.00

Packages chiarged at cost. Dis., 60%.

Adze Eye Miners Picks—Surface, Drifting and Poll.

No.			Per doz.
19, Surface,	No. 1, 4	lbs:	$14.00
19, "	No. 2, 4½	"	15.00
19, "	No. 3, 5	"	16.00
19, "	No. 4, 5½	"	17.00
19, "	No. 5, 6	"	18.00
19, "	No. 6, 6½	"	19.00
19, "	No. 7, 7	"	20.00
20, Drifting,	No. 1, 3	"	12.50
20, "	No. 2, 4	"	14.00
20, "	No. 3, 4½	"	15.00
20, "	No. 4, 5	"	16.00
20, "	No. 5, 6	"	17.50
21, Poll,	No. 1, 3½	"	15.00
21, "	No. 2, 4	"	16.00
21, "	No. 3, 4½	"	17.00
21, "	No. 4, 5	"	18.50
21, "	No. 5, 6	"	20.00
21, "	No. 6, 6¾	"	21.50

Dis., 60, 10 and 5%.

Tamping Picks.

Adze eye, 6 to 7 lbs., per doz., $17.
Adze eye, 7 to 8 lbs., per doz., $18.
Adze eye, 8 o 9 lbs., per doz., $19.
Hunt eye, 6 to 7 lbs., per doz., $17.
Hunt eye, 7 to 8 lbs., per doz., $18.
Hunt eye, 8 to 9 lbs., per doz., $19.
Dis., 60 and 10%.

No.	Ore Picks.	
54, Adze Eye,	5 to 6 lbs.	₱ doz. $12.00
54, "	6 to 7 "	" $13.00
54, "	to 8 "	" $14.00

56, Steel Lake Superior Mining Pick
(Special Price and Quality.)
Dis, 60 and 10

Steel Face Hammers.

No. 43, hand drilling hammers, 2 to 5 lbs.; No. 45, napping hammers, 2 to 5 lbs.; No. 39, mason hammers, 3 to 8 lbs.; No. 42, smiths' hand hammers, 2 to 5 lbs.; No. 44, smiths' striking hammers, 2 to 5 lbs., all steel face, per lb., 26c. Dis., 70 and 10%.

No. 43, hand drilling hammer, 5 lbs. and over, 36c.; 3 to lbs., 40c.; under 3 lbs., 45c. per lb.
Dis., 70 and 10%.

Steel Face Sledges.
No. 34. Smiths' sledges, 6 to 30 lbs., steel face, 17c. per lb.
No. 35. Stone sledges, 6 to 30 lbs., steel face, 17c. per lb.
No. 36. Striking sledges, 6 to 30 lbs., steel face, 17c. per lb.
No. 37. Coal sledges, 5 to 10 lbs., steel face, 18c. per lb.

Cast Steel Sledges.
No. 34. Blacksmiths' sledge. 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.
No. 35. Stone sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.
No. 36. Striking sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.
No. 37. Coal sledge, 5 lbs. and over, 30c.; 3 to 5 lbs. 36c.; under 3 lbs., 45c. per lb.

Cast Steel.
No. 42, blacksmiths' hand hammer, 5 lbs. and over 30c.; 3 to 5 lbs., 34c.; under 3 lbs., 45c. per lb.
No. 44, drilling or striking hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.
No. 45, napping hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 35c., under 3 lbs., 45c. per lb.
Dis., 70 and 10%.

RAILROADS.

Railway Track Punch
Round Point.
15c. lb., net.
Track Wrench.
7¾c. lb., net.
Rail Fork.
9c. lb., net.
Crow Bars,
Wedge Points,
3½c. lb., net.
Pinch Point,
3 ½c. lb., net.
65 Tamping Bar,
6c. lb., net.
66 Claw Bar,
7c. lb., net.
Railroad Spike Mauls
6 to 16 lbs., Steel Face
18c. lb.
Dis., 50, 10, and 5%.
Steel Track Chisel,
15c. per lb., net.

Railroad or Clay Picks.

No.			Per doz.
11, Adze eye,	4 to 5	lbs.	$11.00
11, "	5 to 6	"	12.00
11, "	6 to 7	"	13.00
11, "	7 to 8	"	14.00
11, "	8 to 9	"	16.00
11, "	9 to 10	"	18.00
12, Hunt eye,	4 to 5	"	11.00
12, "	5 to 6	"	12.00
12, "	6 to 7	"	13.00
12, "	7 to 8	"	14.00

Dis., 60 and 10%.

Mattocks—Price per doz.
2, Adze Eye, Long Cutter, 6 lbs., $16.00.
3, Adze Eye, Short Cutter, 5½ lbs., $15.50.
2, Adze Eye, Long Cutter, Light, $15.00.
3, Adze Eye, Short Cutter, Light, $15.00.
4, Hunt Eye, Long Cutter, 6 lbs., $16.00.
5, Hunt Eye, Short Cutter, 5½ lbs., $15.50.

Adze Eye Pick Mattocks.....$16.
Hunt Eye Pick Mattocks.....$16

Dis., 60 and 10%.

Grub Hoes.
Western Pattern, No. 0, 3 lbs., ₱ doz., $10.50.
Western Pattern, No. 1, 3¼ lbs., ₱ doz., $11.
Western Pattern, No. 2, 4 lbs., ₱ doz., $11.50.
Western Pattern, No. 3, 4½ lbs., ₱ doz., $12.
Baltimore Pattern, No. 1, 3¼ lbs., ₱ doz., $11.
Baltimore Pattern, No. 2, 4¼ lbs., ₱ doz., $11.75
Baltimore Pattern, No. 3, 5 lbs., ₱ doz., $12.75.
Baltimore Pattern, No. 4, 5¾ lbs., ₱ doz., $13.75.
Dis., 60 and 10%.

CARPENTERS'.

BOXWOOD RULES.
Two feet, four-fold, 1 inch wide.

Plate.	Middle.	Edge.	Bound.
Round joint	$4	...	$15
Square "	5	$7	15
Arch "	6	8	16

Two feet, four-fold, 1¼ inches wide.

Plate.	Middle.	Edge.	Bound.
Square joint	$7	$10	$18
Arch "	9	11	20

Two feet, two-fold, 1¼ inches wide.

Square joint.	Arch.	Arch Bound.
$5	$7	$16
12	14	24

Gunter's Slide.
Dis. 80, 10 and 10%.

LEVELS.

	10 to 16 in.	18 to 24 in.
Arch top plate, 2 side views	$9.00	$12.00

PLUMBS AND LEVELS.
Arch top plate, 2 side views.

	12 to 18 in.	18 to 24 in.	24 to 30 in.
Polished	$14.00	$16.00	$18.00
Mahogany	....	16.50	22.50
Mahogany tp'd and lp'd	27.00	....	.....
Polished and l pped	.....	.....	24.00
Polished and tipped	.....	.....	28.00
Polished, lip'd and tip'd	.....	.....	35.00

	in.	
Mason's level, 2 plumbs, polished,	36,	$30.00
Mason's level, 2 plumbs, p'd and t'd,	36,	36.00
Mason's level, 2 plumbs, polished,	42,	36.00

PATENT ADJUSTABLE PLUMBS AND LEVEL.

Arch Top plate, 2 side views	26 to 30 in.
Polished and lipped	$27.00
Polished and tipped	30.00
Polished, lipped and tipped	39.00
Mahogany	27.00
Mahogany, lipped	33.00
Mahogany, lipped and tipped	48.00
Polished, triple stock, lipped and tipped	48.00
Mahogany " " " "	60.00
Rosewood, lipped and tipped	90 00

Dis., 70, 10, 10%

POCKET LEVELS.

Iron top, Japanned	2 00
Brass top	3.00

Dis., 70, 10, 10%.

SCREWDRIVERS.

Varnished handles, pat. metallic fastening. Size 1½, $1 per dozen; 2, $1.50; 3, $2; 4, $2.50; 5, $3; 6 $3.50; 7, $4; 8, $4.75; 10, $6; 12, $8. Dis., 75 %.

BAILEY'S PATENT WOOD PLANES.

Smooth.	Handle smooth.	
9 × 3¾ in.	8 × 2 in.	9 × 2 in.
$2	$2	$2.50 each

Jack.	Fore.	Jointer.
15 × 2½ in.	20 × 2¾ in.	26 × 2⅝ in.
$2.50	$2.75.	$3.25 each

Dis., 40, 10 and 10%.

PLANES, BAILEY'S PATENT IRON.
With pat. lateral adjustment.

Smooth, 8 in. × 1¾ in., $3; 9 in. × 2 in., $3.25; 10 in. × 2¾ in., $3.75 each.
Jack, 14 in. × 2 in., $3.75.
Fore, 18 in. × 2⅝ in., $4.75
Jointer, 24 in. × 2⅝ in., $6.50 each.
Dis., 40, 10 and 10 %.

STANLEY IRON BLOCK PLANES.

3½ × 1 in. 20c.
5½ × 1¼ in. 40c.
7½ × 1¾ in. 60c. each.

ADJUSTABLE.

5½ × 1¼ in. 60c.

7½ × 1¾ in. 85c. each.

Dis., 40, 10 and 10%.

STANLEY'S BEADING, RABBET, SLITTING AND MATCHING PLANE.

Eighteen Tools, Bits, etc.

$8 each. Dis., 20, 10 and 10%.

STANLEY "ODD JOBS."

Embraces in combination with ordinary Carpenters' Rule:

(1) Try square.
(2) Mitre square.
(3) T—— square.
(4) Marking gauge.
(5) Mortise gauge.
(6) Depth gauge.
(7) Mitre levee.
(8) Spirit level and plumb.
(9) Beam compass.
(10) Inside square for making boxes and frames.

Price 75 cents.
Dis., 20, 10 and 10%.

Double Gate Brass Valves.

Gland in packing box.

Size.	Screw socket.	Flange.	Diameter of Standard Flange.	Face to face of Screw socket	Face to face of Flanges.	Extra for slide stem and lever subject to discount.
In.	$	$	In.	In.	In.	
⅛	1.25	.....	.....	2¼	.....	$1.00
¾	1.65	.....	.....	2½	.....	1.00
1	2.15	.....	.....	2⅞	.....	1.00
1¼	3.15	.....	.....	3⅜	.....	1.00
1½	4.25	.....	.....	3¾	.....	1.00
2	6.25	11.50	6	4½	4½	1.00
2½	11.50	18.00	6½	4 13-16	5½	1.25
3	16.00	22.00	7	5	6¼	1.25
3½	21.00	31.00	7½	.....	.....	1.25
4	35.00	43.00	9	.....	7 1-16	1.25
5	52.00	64.00	10	.....	9	1.25
6	78.00	90.00	11	.....	.....	1.25
8	.....	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	.....	.....
12	.....	.....	.....	.....	.....	.....

Rubber-Faced Slide Gate Fire Hydrant.

Diameter of pipe connection.	Diameter of stand pipe.	Diameter of seat ring.	One 2½ nozzle.	Two 2½ nozzles.	Three 2½ nozzles.	Four 2½ nozzles.	Six 2½ nozzles.	One steamer nozzle.	One steamer and one 2½ nozzle.	One steamer and two 2½ nozzles.	Frost case, standard length.
Inches.	Inches.	Inches.									
3 or 4	4½	3	$28								$4.50
3-4-6	5¾	4	31	$33.00	$35.00	.....	.....	$33.00	$35.00	$37.00	5.00
4 or 6	7	5	.....	38.50	40.50	.....	.....	38.50	40.50	42.50	6.50
6 or 8	8	6	.....	49.00	51.00	.....	.....	49.00	51.00	53.00	7.50
8 or 10	10	8	.....	.....	.....	.....	.....	.....	.....	.....	.....

For each 6 inches more or less than standard length of stand pipe, add or deduct from list.	For each 6 inches more or less than standard length of frost case, add or deduct from list.	Extra charge for hub.	Independ't nozzle gates each.
$0.60	$0.44	.....	.....
.75	.50	6 in. $0.50	$3.50
.85	.70	No ch'ge	3.75
1.00	.90	8 in. $1.25	3.75
.....	.....	.....	4.50

Star Globe, Angle and Check Valves.

Size, inches:	⅛	¼	⅜	½
Globe and angle	.80	.85	.90	1.20
Check V	.70	.70	.75	.95
Size	¾	1	1¼	1½
Globe and angle	1.55	2.00	3 00	4.00
Check V	1.20	1.65	2.50	3.25
Size	2	2½	3	
Globe and angle	6.50	12 50	19.00	
Check	5.00	11.00	15.00	

Dis., 50%.

Also made heavy and extra heavy for special uses.

EDDY VALVES.

S. S. & O. S. Class L. & Y. 2.

Class 3 and 4. Cl'ss 4.

Size.	Class 2. Iron, brass mounted. Screw, or flange ends.	Add for S S&L	Class 3. All ir'n for gas. Hub ends.	Class 4. Water works valves. Hub ends.	Class 5. Quick opening valves with rack and pinion stem. Iron, brass mounted. Hub ends.	Screwed.	Flanged.
2	$7.00	$1.00	$8.00	$10.00	$10.00	$9.00	$9.00
2½	10.50	1.30	.....	.....	15.00	14.00	14.00
3	13.00	1.40	10.00	15.00	20.00	17.00	17.00
3½	16.50	1.50	.....	.....	25.00	21.00	21.00
4	18.00	1.70	15.00	18.00	30.00	25.00	25.00
4½	22.00	1.80	.....	.....	.....	.....	.....
5	25.00	2.00	20.00	25.00	35.00	31.00	31.00
	31.00	2.30	25.00	31.00	40.00	37.00	37.00
	37.00	2.70	30.00	37.00	.....	.....	.....
	45.00	3.00	35.00	45.00	55.00	55.00	55.00
	60.00	3.50	48 00	60.00	.....	.....	.....
	80.00	4.00	65.00	80.00	.....	.....	.....

All Iron Valves, Classes and 5, 10 per cent. less than Brass Mounted.

Varnish.

E. S. 1827 & Co.

For Finishing Coats.	gal.
Wearing body varnish	$6.50
Medium drying body	5.50
One coat coach varnish	4.50
Wearing carriage	4.50
Heavy gear varnish	4.00
Coach body "	4.00
No. 1 coach "	2.25

For Under Coats.			
Hard drying body	$4.50	Black rubbing varnish	$4.00
Rubbing body varnish	4.00	Priming (1st coat)	2.50
Quick rubbing "	3.50	Filling (2d coat)	2.50
		Rough stuff	2.50

For Inside Work.			
Best flowing varnish	$4.50	Hard oil finish light	$2.75
Best polishing "	4.50	" dark	2.25
Cabinet "	3.00	White copal	4.00

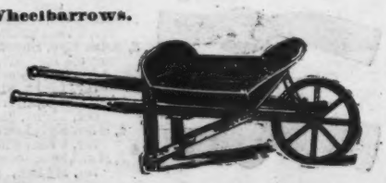
Dryers.			
Japan gold size	$3.50	Brown japan	$1.25
Coach japan	1.75	Liquid dryer	1.25

Discount, 40 per cent. f.o.b. N. Y.

Preservative Coatings.			
Spar coatings	$4.00	Exterior car coating	$4.00
I. X. L. No. 1	2.50	Interior car coating	3.25
I. X. L. No. 2	4.00	Locomotive coating	4.00
Floor finish	2.50		

Discount, 35 per cent, f.o.b. N. Y.

Wheelbarrows.



Climax Bolted Barrow, with Wood Wheel per doz. $22.50.
1½ tire of iron.

Common Nailed Barrow per doz.	$18.50.		
" Bolted " " "	18.75.		
Lansing's Patent Iron-Bolted Barrow, per doz.,			$25.50
Capital Patent Bolted Dirt " " "			30.00
Red oak or Government " " "			40.50
Wharf " " "			72.50
Mortar " " "			30.00
Bent Handle Stone " " "			48.00
Coal or Ore " " "			31.50
Pig Metal or Casting " " "			40.50
Brick Yard 20 inch Iron Wheel "	each		10.50

Globe Patent Bolted Garden Barrow } per doz., 42.50.
Box 30 by 24 by 12 deep, wood wheel }

Capita Patent Barrows

With Iron Tray, A, per doz.,	$39.00
" " " B, " "	42.00

The Leader Iron and Steel Barrows.
Gas-pipe Legs and Handles in one price.

No. 1 Tray of 16 iron, capacity 3 cu. ft. of earth, each	$12.
No. 2 " " 14 " " 5 " " " "	
or 250 lbs. of coal	" 15
Galvanized 18 iron, capacity same as No. 2	" 15

Water Wheels. Pelton.

	Under pressure of 30 Lbs.	60 Lbs.	100 Lbs.
No. 1, $25	⅛ H. P.	1 H. P.	2 1-10 H. P.
No. 2, $50	¾ "	2⅛ "	5 "
No. 3, $90	1⅛ "	4 "	8½ "
No. 4, $140	2⅛ "	7 "	14¾ "
No. 5, $190	4⅛ "	12½ "	26 "

Dis. 15%.

Whiffletree.

Willson spring Jeffery Manufacturing Company.

	Single.	Double.
No. 1, 34 or 36 inches long	$1.25	$2.50
No. 2, " " "	1.40	2.75
No. 3, " " "	1.50	3.00
No. 4, " " "	1.65	3.25

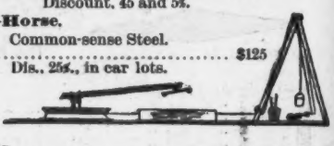
Including either steel hooks or rings'
Discount, 45 and 5%.

Whims—Horse.

Common-sense Steel.

F. O. B. $125

Dis., 25%., in car lots.



Windmills.

10 ft. pumping	$75	Plus cost of packing.
12 ft. "	95	
14 ft. "	140	
16 ft. "	225	

Dis., 50 per cent.

"Stover" Pumping Windmills (no tower).

Size wheel.	Wt. packed.	Cubic ft.	Price.
10 ft.	650	50	$80.00
12 ft.	750	58	100.00
"Zenith" Pumping Windmills (no tower).			
10 ft.	650	48	85.00
12 ft.	750	57	110.00
Dis., 50 per cent.			
14 ft.	1,400	108	160.00
16 ft.	1,600	114	250.00
Dis., 45 per cent.			
20 ft.	2,950	220	400.00
25 ft.	4,225	280	600.00
Dis., 40 per cent.			
"Zenith" Geared Windmill (no tower).			
Prices include upper set of Gears and about 5 feet vertical extra heavy shaft in windmill head.			
14 ft.	1,550	178	280.00
16 ft.	1,780	198	300.00
20 ft.	3,170	216	500.00
Dis., 40 per cent.			

Wire Rope.

Circumference in inches.	Diameter in inches.	Price in cents per foot best crucible cast steel rope. 19 wires to strand.	7 wires to strand.	Price in cents per foot best bright iron rope. 19 wires to strand.	7 wires to strand.	Price in cents per pound galvanized iron rope. 12 wires to strand.	7 wires to strand.
5¼	1¾	100	.....	69	.....	11	10½
5¼	.....	90	.....	64	.....	"	"
5	1⅝	80	.....	58	.....	11½	"
4¾	1½	71	.....	53	.....	"	"
4½	.....	65	.....	48	.....	"	"
4¼	1⅜	60	60	43	39	"	"
4	1¼	50	50	36	34	"	"
3¾	.....	46	.....	33	.....	"	"
3½	1⅛	41	40	29	27	12	10¾
3¼	.....	.....	.....	.....	.....	"	11
3⅛	1'	34	32	26	23	.....	.....
3	.....	33	.....	24	.....	"	11
2⅞	⅞	27	25	20	19	.....	12
2¾	.....	23	.....	18	.....	.....	13
2¼	¾	21	19	16	14	.....	14
2	⅝	18	14	14	10½	.....	15
1¾	9-16	17	11	12	8	.....	16
1⅝	½	15	8	10	7	.....	16
1¼	⅜	.....	.....	8	5	.....	17
1	5-16	.....	.....	.....	4	.....	18

Discounts, for export in bond, requiring from four to six weeks time, 55%.